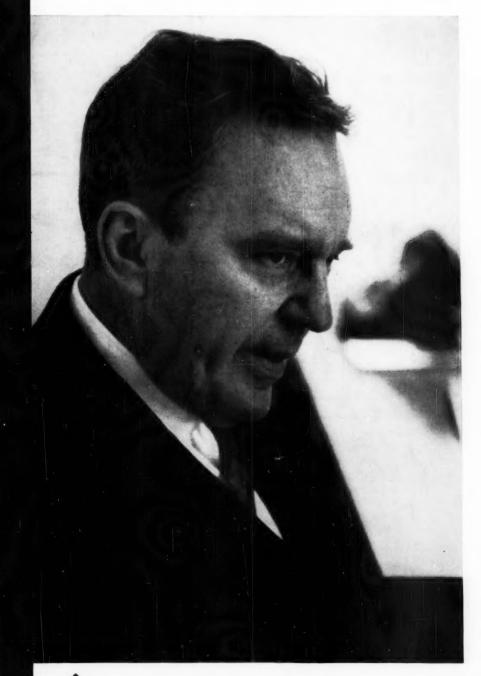
Chemical Week

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LPG for Cleveland.
Petrochemical hopes
ride with approaching
pipelinep. 21

Piecemeal or package equipment buying?
Plant builders now have choice ...p. 41

Citrus chemicals
come of age, ring up
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Cheaper acetylene
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MALLINCKRODT'S THAYER LIFTS REORGANIZATION WRA

VANA KRBOR WICH
SIS N IST ST
UNIVERSITY MICHOFILE



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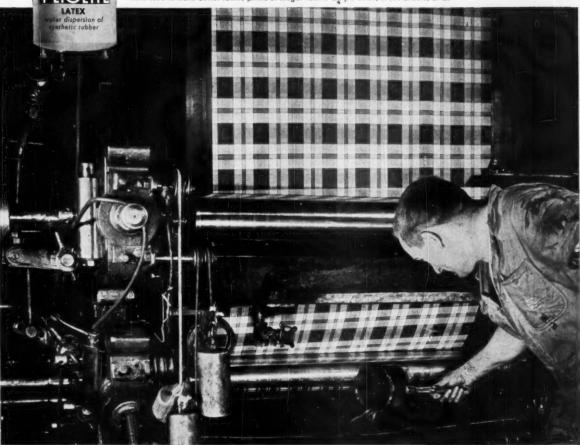
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FOOD MACHINERY AND CHEMICAL CORPORATION
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as used to make better textile prints at Riegel Textile Corporation, Ware Shoals, S. C.



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CHEMICAL DIVISION

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40 plants and offices

ON THE COVER: Harold Thayer, new president of Mallinckrodt Chemical, has reorganized the 93-year-old company on a threedivisional basis. Details of his plan are on p. 67.



Chemical Week

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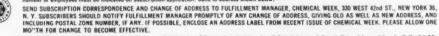


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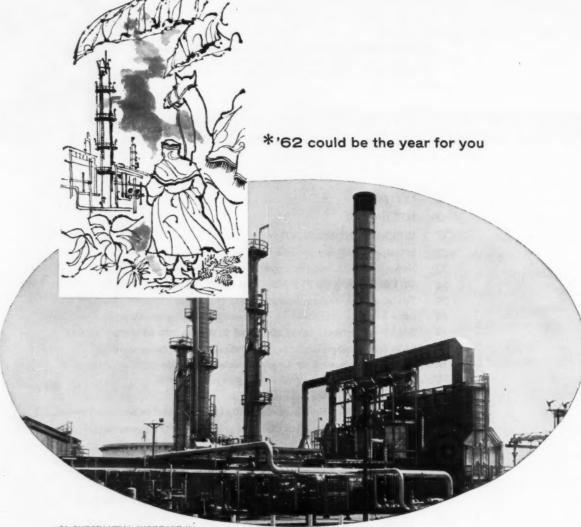


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LETTERS

Space-Age Scheduling

To the Editor: I read "Space Age Scheduling Arrives in CPI" (Oct. 15, p. 74) with considerable interest since it appears that [the] "CPI" have "discovered" a scheduling concept approaching that used by petroleum refinery contractors about ten years ago.

Rather than a "seat of the pants" approach, more advanced techniques than those described in the above article are now being used to schedule and control activities where many contracts are being engineered concurrently at various stages of completion.

This type of sequential scheduling was fully described in articles which I had published in the *Oil and Gas Journal* on March 23, '53, March 30, '53, April 6, '53 and April 13, '53.

M. MATTOZZI

36 Adam Road West Massapequa, N.Y.

Automotive Adhesives

To THE EDITOR: I was very much interested in your article "Adhesives: Hidden Plus in the New Models" (Oct. 29, p. 27).

. . . So far the adhesives used for joining hood and deck lid inner panels to outer panels are almost all based on neoprene. So far as I know, there are no epoxy adhesives used for this purpose.

Most of the neoprene adhesives that are in production use are not 100% solids; at the moment, they are closer to 70%. There is, however, a trend toward higher solids content to eliminate bond stresses due to shrinkage when the solvent evaporates.

Dr. Sumner Twiss of Chrysler has stated the requirements of such an adhesive very well; and based on these requirements, neoprene-based materials appear to be the strongest contenders for joining sheet metal sections. In addition to adhesives manufacturers whom you mentioned in your article, other leaders in the field of metal-to-metal bonding for the automotive industry include Presstite Division of American Marietta and Thiem Products, Inc.

... A recent issue of our "Elastomer News for Automotive Engineers" [describes] Ford's application of neoprene for hood bonding. The process and materials involved are

quite similar on both the Chrysler hood and the Corvair rear-engine cover mentioned in your article. American Motors is using a similar material for their hoods, too. . .

> R. W. MALCOLMSON E. I. du Pont De Nemours & Co. Detroit, Mich.

Reader Malcolmson is right. Neoprene adhesives are in production usage now, but epoxies are expected to enter the field. Commercial neoprene adhesives are in the 60-90% solids range, but materials of 100% solids are in research.—ED.

Use Standards Properly

To the Editor: I read with interest your article on progress in pump standardization (Oct. 29, p. 67), the more so because I have been active on the ASA Sectional Committee since those early days when we were hoping for published standards in two years at the most. The experience has been most educational.

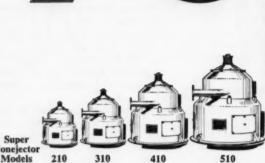
I believe that application of the same qualities of modest demands, sound analysis, and patience with divergent viewpoints which have been learned in pump standards work will bring success to the quest for heatexchanger standards. I must therefore challenge the recently expressed view (which you have presented in a commendably temperate way) that standard heat exchangers will cost more than custom designs. I heartily agree with your observation that standardization is complex, and requires careful engineering study to see whether there will really be savings.

In Monsanto's early studies of heatexchanger standards we identified many cost factors that vary in importance with equipment size and with complexity of construction. For fixed tube-sheet designs we found the merits of "predesign" fading fast above 1,000 sq.ft. Therefore, we concentrated our efforts on relatively small units that have large usage in many-but not all -of our operations. We developed enough sizes in this range to avoid the necessity for buying wasted area, or for taking undue pressure drop penalties. A large part of our savings have been from an associated "cookbook" design procedure (made practical only by the reduction of variety in basic design parameters), as well as free-

dewater up to-

70

TONS OF SOLIDS/HOUR





with the SHARPLES SUPER CONEJECTOR

WHY is the Super Conejector superior to other types of centrifuges for certain types of solids dewatering? Why can many crystalline solids and fibrous pulps be dewatered at higher throughput rates, to desired dryness and particle size classification by the Sharples Super Conejector?

The answers are simple and direct:

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ing action of a screw conveyor-applied simultaneously to the slurry.

Second, because specific process requirements can be met by varying screen size, rotational speed, etc.

Third, because only Sharples has four sizes of Super Conejector from which to select the one best suited for your particular requirements.

The Super Conejector fills an important spot in slurry processing and in many dewatering applications it offers unexcelled efficiency, capacity, and low cost. We'll gladly send you descriptive literature on the Super Conejector.

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LETTERS

dom from repeated mechanical detailing.

The moral of this message: standards can't do everything. If they are misapplied they can be a detriment, not a help. We hire engineers to use good judgment, and this applies equally to their use of standards.

W. G. CANHAM Section Manager, Standards Research & Engineering Div. Monsanto Chemical Co. St. Louis, Mo.

'Don't It Yourself'

To THE EDITOR: Your article on "do-it-yourself analysis" (Oct. 22, p. 89) was quite interesting, only I could not help but indicate various pitfalls that I have seen in the few places where this type of analysis is practiced.

(1) There is analytical equipment all over the research area, most of which is only used part of the time. Where "do-it-yourself" analysis is allowed to prevail, everyone becomes an "analyst" and wants analytical tools of his own and people to use them. Thus, the research department as a whole gets overstocked with tools and men-and both are expensive.

(2) Analysis is a very large and complex field. There are about fourteen types of analytical approaches which are intimately interrelated. . . . In a decentralized unit, the different analytical approaches are practiced in different areas and departments, and the combined use of the "analytical tool kit" is lost. . . .

(3) Analysis can only be optimally practiced by analysts. . . . There are six major analytical journals with hundreds of papers per month. There are many symposia per year, solely on the subject of analysis. The research man cannot possibly keep up with the analytical technology. . . .

In building a house you have plumbers, carpenters, masons, and

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

electricians. Each understands the other's job and the job of each depends on the work of the other. . . . The relationship between synthesis chemists, analysts, engineers, physical chemists, etc., is exactly comparable -each is the most expert in his own area, even though each has some knowledge of the other areas.

I have first-hand data on decentralized vs. centralized analysis. My present analytical people were once scattered and operated in a decentralized manner. They were centralized not long ago. With the same number of analysts and the same research group to be serviced, the analytical work load increased 400% in one year, indicating the existence of much analysis which was not even thought possible-analysts can insert their technology into areas where people in the other chemical disciplines cannot see the application. . . .

The cost per analysis was reduced to one-third the cost before centralization. Each of the 26 analytical people involved reported in a survey after the first year of operation that the centralized department was much more effective than the decentralized. The analysts also found the work more interesting because of the mixing of analytical disciplines.

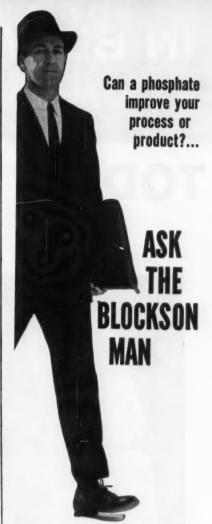
The synthesis chemists should be allowed to do what they are best equipped to do-synthesis; and the analysts to do what they are best equipped to do-analysis. If you have synthesis people doing analysis, you are consuming good synthesis people and obtaining less than optimum analysis-at a higher cost.

> SIDNEY SIGGIA Manager Analytical Services, Research Olin Mathieson Chemical Corp. New Haven, Conn.

MEETINGS

American Institute of Chemical Engineers, annual meeting; theme: chemical engineering in government programs; Statler Hilton Hotel, Washington, D.C., Dec. 4-7.

American Nuclear Society, annual winter meeting, Mark Hopkins and Fairmont hotels, San Francisco, Dec. 12-14. Two highlights: talk on transuranium elements by Glenn T. Seaborg; and the Atom Fair, jointly sponsored by ANS and the Atomic Industrial Forum at the Masonic Temple, San Francisco, Dec. 12-16.



A Sodium phosphate is a team player. It works well with other chemicals. A good example is petroleum based synthetics. Certain phosphates materially improve their performance.

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IN BLOW-MOLDING

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TODAY



TAILORMADE FOR TOUGH JOBS

These nesting Hi-fax bottles carry the water supply for a housetrailer; they were custom-blown to fit available space in trailer interior. Hi-fax, high-density polyethylene, was the pioneer plastic in thin-wall, blown containers. Hi-fax set the standard... was the first material approved by both producers and users of plastic containers for light-duty liquid detergents. While other materials seek to match the Hi-fax standard, Hi-fax remains universally in demand in this first major market for blow-molded high-density polyethylene products.

The same physical and processing properties which enabled Hi-fax to pioneer the breakthrough in detergent bottles have proved equally useful in household chemical, drug and cosmetic containers, and in the development and production of industrial packages of increasingly larger size and scope.

As blow-molding horizons broaden, Hi-fax will continue to lead the way . . . in product testing, market development, and continuous research designed to improve the properties and performance of today's finest blow-molding material.



BIG FAVORITE WITH BIG BRAND NAMES

Hi-fax blown containers are now used by all of the major manufacturers of light-duty liquid detergents.



FOUR VARIATIONS ON A THEME

Avon uses the same Hi-fax container to package both liquid and dry products in its new line of children's cosmetics.

HI-FAX LEADS THE WAY

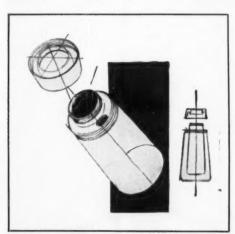
The larger the part—the greater the need for Hi-fax

TOMORROW

Growing faster than any other sector of the plastics industry, blow-molding now reaches out into many new markets: industrial packaging, sporting goods, toys, furniture, lighting, and automotive and marine parts. Parts grow larger as improved equipment and processing techniques keep pace with new demands. And still leading the way is Hi-fax, for the larger the part, the greater the need for Hi-fax in terms of superior physical properties and ease of processing.

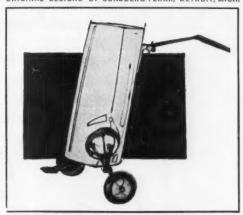
Hi-fax leads the way, too, in new market developments. Hercules blow-molding experts are ready to help you with design and product planning, in order that you may achieve maximum economies in material and production costs.

Here's a preview of some of the brand new product ideas now possible with Hi-fax and blow-molding:



INDUSTRIAL PACKAGING:

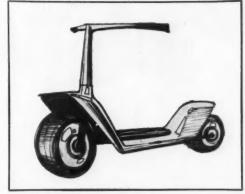
Double-wall bottle solves the packaging problem which arises when two separate ingredients in a product must be shipped separately for mixing immediately prior to use. Blow-molded with Hi-fax, this combination bottle would have the all-important stress-crack resistance so necessary when corrosive products are involved. ORIGINAL DESIGNS BY SUNDBERG-FERAR, DETROIT, MICH.



SPORTING GOODS:

This ingenious design for a golf cart combines bag and wheeled-carrier in a single, compact, lightweight unit which can be readily blowmolded with Hi-fax.

Wheels (and tires, if desired) could be blown parts, too. Complete unit would be highly functional, less tiring to use, weather-resistant, and significantly lower in cost.



TOYS:

Tough, but handsome, too, blow-molded Hi-fax has just what it takes for the design of such modern-styled outdoor toys as this. Both body and wheels could be blown with Hi-fax, resulting in a unit that would be less than half the weight of a metal counterpart, with a finish that would not dent, chip off, rust or corrode.



HERCULES POWDER COMPANY

Hercules Tower, 910 Market Street, Wilmington 99, Delaware

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Springfield, Massachusetts



FIRESTONE'S DYNAMIC

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Diene is a rare research achievement that will allow dynamic product development to surge into hundreds of new channels. The remarkable characteristics of this new Firestone polymer may provide an exciting new potential for your product

Firestone's Diene is strikingly superior to natural rubber in four important respects: resilience, abrasion resistance, high dynamic modulus and low temperature properties. In processing, it possesses a complete lack of "nerve." In content, it is extremely pure with no gel, no moisture and extremely low ash. The water soluble ash is nil, providing excellent electrical properties. Its aging and cracking resistance: better than natural rubber.

Diene is perfectly compatible with Styrene-Butadiene and natural rubber. When combined with them in major proportions, it lends startling new properties to the resultant compound-properties that expand and excel the best features of each polymer.

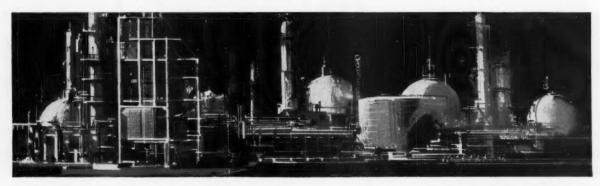
Truck tires combining major proportions of Diene with natural rubber were road-tested for more than three million miles with amazing results. The Diene tire's wear resistance proved stubborn and startling. Its traction is quick and eager, gripping slick surfaces when other tires spin. It runs cooler at all speeds and gives a measurable boost to gasoline mileage. Moreover, Diene promises to make equally dramatic improvements in other rubber products.

Firestone's new Diene plant—beginning operations January, 1961, in Orange, Texas—is the first to be built by any rubber company. It is another symbol of Firestone's continuing determination to have complete production facilities to make a quality rubber for every purpose.

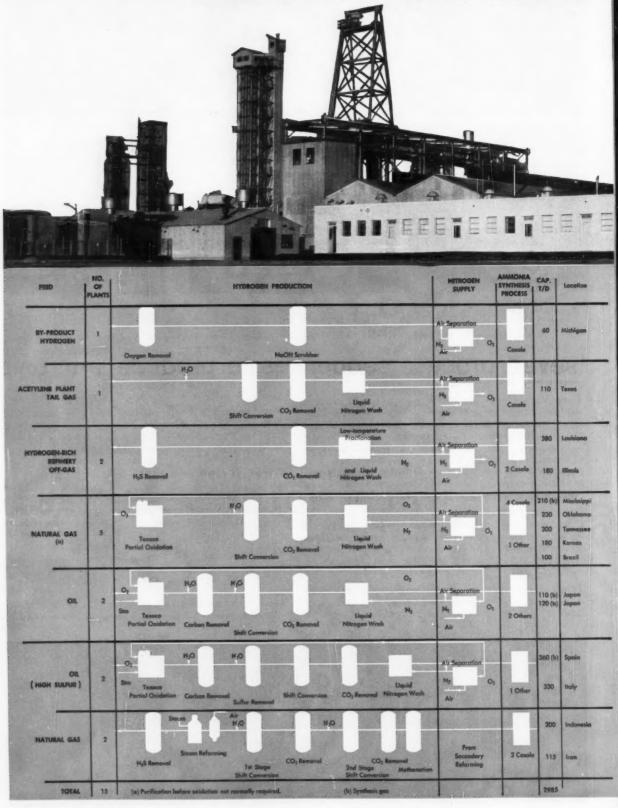
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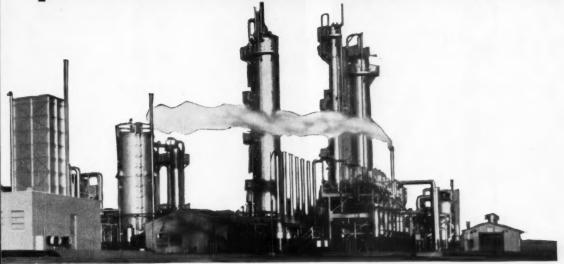
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AMMONIA



process installations 1945-1960



Worldwide experience with six feeds utilizing seven process sequences to produce ammonia

More than one million tons per year ammonia capacity has been built or is under contract by Foster Wheeler. Eight Foster Wheeler plants account for 20% of the tremendous increase in the production of ammonia in the United States over the last decade. The table at left provides a brief view of FW's process flexibility and worldwide experience.

The most recently completed FW ammonia plant exceeded rated capacity within one month of start-up. Economic production over a wide range of outputs has been realized. From plants of modest size, to those in the higher capacity ranges, these Foster Wheeler ammonia plants turn in exceptional performances.

Foster Wheeler has also designed and constructed two of the largest urea plants in the United States. Both use the Pechiney-Grace process featuring total recycle and produce urea of superior quality and color. To get information on the ways Foster Wheeler process experience can serve you, write to Foster Wheeler Corporation, 666 Fifth Avenue, New York 19, New York.

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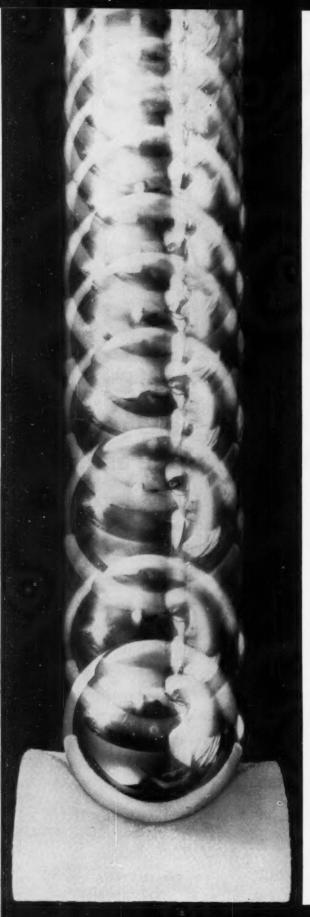
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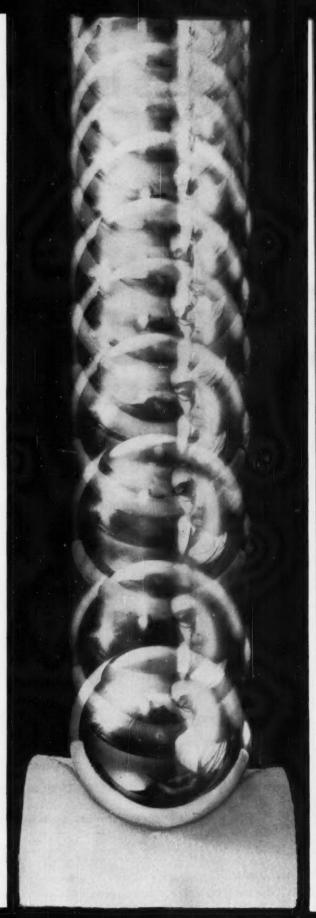


WHEELER

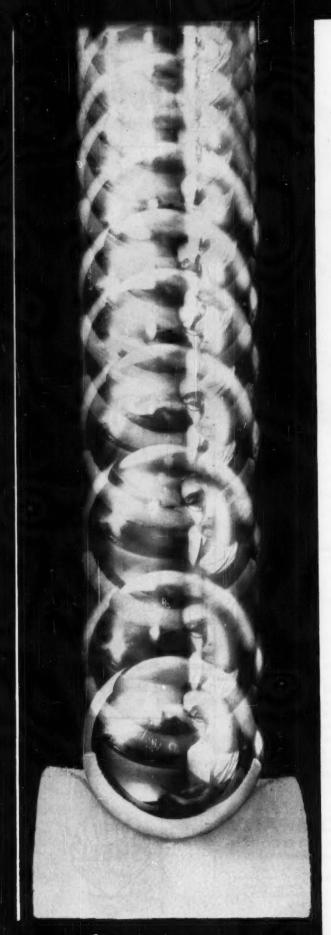
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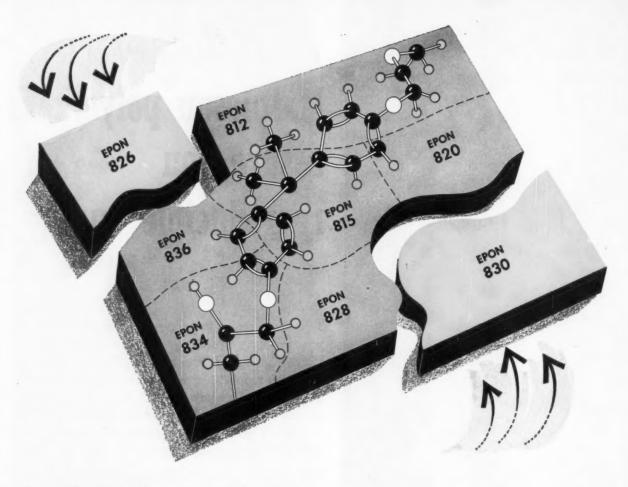
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Two new additions to the liquid Epon resin line, 826 and 830, complete the "viscosity spectrum" to bring you maximum flexibility of application. Now there is an Epon resin to meet almost any formulation need.

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Business

Newsletter

CHEMICAL WEEK
December 3, 1960

Major petrochemical expansions are the big news this week. Making these moves: W. R. Grace, Gulf Oil, and the U.S. Rubber-Borden Co. joint venture.

Three moves put Grace deeper into plastics. High-density polyethylene capacity at Baton Rouge, La., will be expanded 50%. Existing capacity is 50 million lbs./year—or about 40 million lbs./year, if a copolymer is manufactured.

Grace's Polymer Chemicals Division will also add a full line of low- and medium-density polyethylene resins, produced by U.S. Industrial Chemicals at Houston. Grace will supply USI with the ethylene, buying it in turn from an "established" Houston supplier.

Polystyrene will be added to the Polymer Chemicals Division line when it undertakes marketing of the resins produced by Cosden Petroleum Corp. (Big Spring, Tex.), 53% owned by Grace. Cosden is substantially increasing its polystyrene capacity, currently slated at 20 million lbs./year.

Gulf Oil will boost petrochemical investments "substantially" next year, according to President E. D. Brockett. Brockett declines to be more specific now, but best guess is that expansion will be in more petrochemical "building blocks" and that Gulf will stick to its policy of not competing against its customers. One possible project discussed in the trade: a third ethylene unit at Port Arthur, Tex. Another guess: that if Gulf does expand in ethylene, it might use some of that increased output, along with benzene from its year-old aromatics extraction unit at Port Arthur, to produce ethyl benzene for sale to styrene producers.

The vinyl chloride plant of U.S. Rubber and Borden is moving ahead. The joint petrochemical venture, called Monochem, got off the ground last week when the two parent companies exercised an option on an 850-acre site in the Baton Rouge area—near Geismar, La. (CW Business Newsletter, May 21). Location of the \$50-million chemical complex had hinged largely on obtaining an economical natural gas supply, which has now been contracted from the Sugar Bowl Pipe Line Co. (Thebodaux, La.).

The complex—which will initially have capacity for 150 million lbs./year of vinyl chloride monomer and 80 million lbs./year of acetylene —indicates a U.S. Rubber move toward additional polymer production. Borden could consume little more than half of the proposed monomer output; U.S. Rubber is already meeting its own requirements at Painesville, O. Likely answer: a conversion of the Painesville plant to up U.S. Rubber polymer production and at the same time eliminate monomer output there in favor of the cheaper Monochem material.

Construction of the initial plants and utility facilities will likely get under way next month; onstream date will be in '62.

Business

Newsletter

(Continued)

Three well-known industry names in the news this week:

August Kochs, 89, founder of Victor Chemical Works, died last week in Chicago. Since last year's Stauffer-Victor merger, he had served as vice-chairman and member of the Stauffer board of directors.

George R. Milne-previously head of Air Reduction Co.'s National Carbide Co. division—becomes the first president of the newly formed Air Reduction Chemical and Carbide Co. This move puts all activities of three former Airco divisions-Air Reduction Chemical Co., Colton Chemical and National Carbide-into a single operating unit.

Louis W. Cabot will take over as president and chief executive officer of Cabot Corp. (Boston), succeeding his father, Thomas D. Cabot, who now becomes chairman of the board.

Two new projects in Mexico are both multisponsor ventures. Celanese Mexicana—partly owned by Celanese Corp. (New York) and Chemcell Ltd. (Montreal)—is setting up a new company with Mexico's Quimica General, S.A., and Germany's Farbwerke Hoechst to produce petrochemicals at Mexico City. And Industrias Quimicas de Mexico-40% owned by Stauffer Chemical-and Du Pont are forming a new concern, Halo Carburos, S.A., to produce Freon fluorinated hydrocarbons and carbon tetrachloride at Santa Clara.

Natural gas companies diversifying into petrochemicals are making this trend look more and more like a stampede (see p. 21). Latest to feel the lure of higher profit margins on upgraded hydrocarbons is Houston Corp. (St. Petersburg, Fla.), which will build a \$7-million extraction plant at Brooker, Fla., near Jacksonville. Houston has organized a new company, Florida Hydrocarbons Co., to construct and operate the plant. But the go-ahead will depend on approval by the Federal Power Commission of an increase in the parent company's gas supply to 370 million cu.ft./day. And Sun Oil Co. says it is "definitely interested" in an option to buy 50% interest in the operation.

Brush Beryllium will own a reported 39% equity interest in Beryllium Resources when the legal red tape is ripped away this week (CW, Nov. 26, p. 39).

Brush comes into the picture in accordance with a basic agreement negotiated several years ago. Since then it has provided BR with the services of its chief consulting geologist, Norman Williams, who has since become a vice-president of BR. And by teaming with a fabricator, BR greatly enhances its marketing strength.

Brush steps ahead as well by gaining an interest in a company with promising claims on beryllium-bearing ore deposits and with what it regards as a proved method of reducing these ores in the Van Dornick froth flotation process.



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n-Alkyl	Formula	Assay %	Boiling Point °C.	Sp. Gr. (20°/20°C.)	n-Alkyl	Formula	Assay %	Boiling Point °C.	Sp. Gr. (29°/20°C.)
Methyl	CH ₃ Br	99.8	3.7	1.732††	Lauryl	C ₁₂ H ₂₅ Br	61.51	151-208 (45 mm Hg)	1.030
Ethyl	C ₂ H ₅ Br	99.8	38.4	1.455	Myristyl	C14H29Br	50 [†]	158-186 (10 mm Hg)	1.000
Butyl	C ₄ H ₉ Br	99.7	101.6	1.279	Cetyl	C ₁₆ H ₃₃ Br	801	183-216 (10 mm Hg)	0.997
Hexyl	C ₆ H ₁₃ Br	96	155.5	1.165	Stearyl	C ₁₈ H ₃₇ Br	86†	Decomposes	0.976†††

†Contains other long chain alkyl bromides

tto°C./o°C.

†††25°C./25°C.

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LPG Linkup Lifts Ohio's Potential

Petrochemical processing is now in the offing for Ohio's big chemical centers at Ashtabula and Painesville. Reason: new 96-mile pipeline joining 'Little Big Inch' and Buckeye natural gas networks could bring C_3 - C_5 liquids from Texas at low carrying costs.

Chemical industry observers are reading something extra into last week's completion of a 96-mile, 10-in. tie-in pipeline between Texas Eastern Transmission Corp.'s "Little Big Inch" terminal at Lebanon, O., and Buckeye Pipeline Co.'s system in northeast Ohio. What they see: a line that may feed the rise of a new petrochemical complex on the Lake Erie shore.

The new connection puts Texas Eastern's LPG stream into Cleveland via the Buckeye lines, which run into Michigan and Indiana as well. The CPI will get its boost if and when plans to build spur lines to the two big chemical centers on the Ohio's Erie waterfront, Ashtabula and Painesville (see map), go through.

This latter proposal hasn't been gelled yet; TET and Buckeye may do it as another joint venture; or TET may go it alone. Texas Eastern is the more eager, since it is eyeing the petrochemicals field, and its management likes the looks of the Cleveland area.

Poised for a Plunge: Probably TET won't take the step alone if it succeeds in drumming up customers that will use its LPG hydrocarbons for basic petrochemical production. But if such customers don't materialize, TET says it may plunge into petrochemicals on its own hook, upgrading its own raw materials.

Already, this area has a substantial concentration of CPI firms, but they are producing primarily inorganic chemicals; the area's key raw materials include salt, limestone, coke and metal ores. In Painesville are Air Products, Calhio Chemicals, Diamond Alkali, General Chemical Division of Allied Chemical, Lubrizol Corp., Mor-

ton Salt Co., Naugatuck Chemical Division of U.S. Rubber Co., and A. E. Staley Mfg. Co. Clustered in Ashtabula are Archer-Daniels-Midland, Detrex Chemical Industries, General Tire & Rubber, Reactive Metals Inc., Union Carbide Metals, U.S. Industrial Chemicals, and Lubrizol Corp.

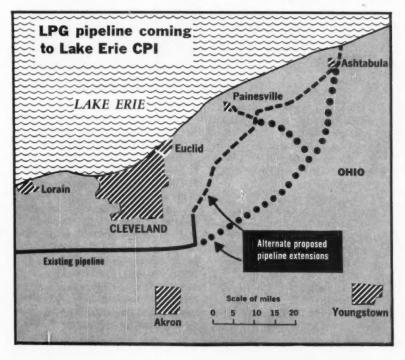
Markets, Water, Power: A new petrochemical complex supplied year-around with raw material from the Southwest could now spring up among these operations, based on TET's hydrocarbons. Two nearby basic industries—steel and rubber—stand out as prospective markets.

Here's how industry men appraise the outlook for a Lake Erie petrochemical center. It would have:

- (1) Plenty of fresh water.
- (2) Good transportation, including access to the St. Lawrence Seaway.
 - (3) Low-cost electric power.
 - (4) Access to large supplies of salt.
- (5) Underground storage for LPG in salt beds. (TET is already lining up salt bed storage in the area.)
- (6) Delivery of liquid hydrocarbons by pipeline.

Helping to grease the ways is Cleveland Electric Illuminating Co., which would benefit from large new CPI customers moving in. Big talking point with Cleveland Electric is strategic location; that is, nearness of potential markets for products and intermediates in the Midwest, Northeast and Mid-Atlantic states.

Seeking Higher Returns: Petrochemical diversification has a strong attraction for pipeline firms such as Texas Eastern, which are under increasing pressure to boost earnings by diversifying into nonregulated industries. Although interstate transporta-



tion of LPG is under control of the Interstate Commerce Commission, LPG's sale and that of its derivatives is not limited or regulated.

And there is potentially more profit on upgraded products than on natural gas. Estimates on the economics involved illustrate the point: natural gas sells at about $\frac{1}{2} \frac{e}{|b|}$; LPG, $1-\frac{1}{2} \frac{e}{|b|}$.; and ethylene, about $\frac{5}{|b|}$

To Texas Eastern, a new market also means bringing present pipelines up to capacity use. TET believes that the new business generated by the Buckeye tie-up should add some 25,000 bbls./day of natural gas products to the 20-in. Little Big Inch's throughput within two or three years. Carrying capacity of the main line is 180,000 bbls./day. Since the 14-in. lateral to Chicago draws only 90,000 bbls./day, the line has surplus capacity.

And LPG from Canada: It's significant that talk of the new line comes as another proposed Great Lakes petrochemicals raw-material source, Canada's Alberta fields, is losing some of its luster. Two Canadian petrochemical companies have protested Foothills Pipe Line's plan to export Alberta's petroleum raw materials to the U.S. via a line to Chicago (CW, Oct. 22, p. 27). This doesn't mean the project will be junked. A defense of the plan has been placed before the Alberta Oil and Gas Conservation Board.

Should Foothills get the go-ahead, there could be some rugged competition in Great Lakes petrochemicals. It would be Canadian LPG-based products battling Texas LPG materials—and it could truly stimulate Midwest industrial growth.

Polymer Ups Its Ante

Polymer Corp. (Reading, Pa.) is confidently investing more money in its Whirlclad system of fluidized-bed coating (CW, Sept. 3, p. 56) even though Whirlclad has yet to bring in a profit.

Reasons for the profitability delay: high investment costs and a time-consuming sales procedure.

According to an official, licensing arrangements, whereby large industrial users do their own Whirlcladding in their plants, is the large-volume end of the business; it usually requires a customer investment of from \$80,000 to \$500.000.

Expansion of Whirlclad facilities will take a large share of the \$2.75 million that Polymer is trying to raise with a new debenture offering. A new custom-Whirlcladding plant at Rolling Meadows, Ill.—near Chicago—will require \$450,000, largest single chunk of the new capital, aside from \$1.35 million to be used to retire bank loans. The firm will use \$210,000 to build an addition to its plant that manufactures plastic powders for use with the Whirlclad system.

DIMENSION





NGP's Gass, Murphy's Brown Ponder It

Two other natural gas companies besides Texas Eastern (p. 21) this week appear to be poised for a plunge into petrochemicals—Northern Gas Products Co. (Omaha, Neb.) and Murphy Corp. (El Dorado, Ark.).

Northern Products, wholly owned subsidiary of Northern Gas Co., has started construction of a propane extraction plant at Bushton, Kan., capable of processing 900 million cu. ft./day of natural gas, according to P.A. Gass, newly appointed president of the subsidiary. Also, the company is having a Dallas chemical process consulting team make a thorough study of other

possible expansions into the CPI.

Add to this announcement the fact that its development manager is Gus Montes, formerly with Ethyl Corp. and then with U.S. Industrial Chemicals, and the total points plainly to Northern's entry into petrochemicals.

Also warming up on the sidelines is Murphy Corp., which also recently added a former chemical company executive, Bruce K. Brown, to its board of directors. Before this post, Brown was president and later board chairman of Petroleum Chemicals Inc., a petrochemical company owned by Cities Service and Continental Oil.

Order Out of Chaos

Consensus among organic chemical producers seems to be that the Tariff Commission—in its proposal last week for a new classification of commodities—has done a "magnificent job" on a very complex assignment.

The new classification study, ordered by Congress in '54, and to be presented to it in '61, should do much to clarify the situation to industry people, whether they are trying to cope with the tariffs or change them. The old conglomeration of regulations was, as the commission says, "in large measure a mystery to the uninitiated and full of constant surprises even for persons who have devoted their lives to the subject."

But many details still must be worked out before Congress can act on the proposal. For example, some experts feel that certain definitions will require court trials before it's certain what the interpretations will be. Two examples cited were the difference between resins and "resin-like products," and what exactly will be included in the term "petroleum distillates."

Hearings probably will be held.

Posting New 'Danger' Signs

Warnings and admonitions went out to the chemical industry via the more than 1,050 company delegates attending last week's semiannual meeting of the Manufacturing Chemists' Assn. (see also pp. 68, 87). The new danger signs point to the need to check the profit squeeze, bolster the industry's public and governmental relations, and maintain high standards of managerial ethics.

The precautionary advice came from many of the 30 speakers at the all-day conference in mid-Manhattan's Statler-Hilton Hotel. Particularly compelling was the warning from members of the panel on chemical products liability (pictured at right). Moderator of this panel: A. J. Dentzer, insurance and real estate manager for Wyandotte Chemicals and chairman of MCA's Insurance Committee.

Counseling intensive and unrelenting attention to this problem on a coordinated, company-wide basis, Associate General Counsel H. P. Schoen of Hartford Accident & Indemnity Co. cited three reasons for increased chemical industry concern:

- (1) Hazards inherent in the industry's many new products are unforeseeable.
- (2) "Absolute liability" is being imposed on manufacturers, regardless of fault.
- (3) People are becoming more and more claim-conscious.

In the past, Schoen told delegates, a manufacturer would normally not be held liable to the ultimate consumer for breach of express or implied warranties unless (a) the manufacturer sold the product directly to the ultimate consumer, or (b) the products were in the category of foods, drinks or drugs.

But recently, he pointed out, the courts have been broadening both of these doctrines. Absolute liability on the part of the manufacturer has been imposed in such nonfood cases as home permanent-wave sets allegedly causing loss of hair, soap detergents causing skin rash, and flammable cowboy suits burning little children.

And New Jersey's supreme court declared only last May, Schoen continued, that any product would come under this same judicial concept if it could injure people if improperly manufactured. The maker is liable whether or not there are any direct sales to consumers to establish the "privity of contract" that was once an essential element in product liability cases.

"Please remember that once privity of contract is no longer required, not only can the ultimate customer sue you, but also your utmost care in manufacturing is no defense," Schoen concluded. "This is liability without fault. Even the contributory negligence of the claimant is no defense. The famous Cutter Laboratories polio vaccine cases illustrate this."

Manufacturers can no longer assume that their products are, by their very nature, unlikely to be involved in liability claims, according to Insurance Manager R. H. Lander of Merck & Co. He cited as "a rather bizarre instance" a case in which both the manufacturer of pyroxoloid hair combs and a dealer were held liable to a woman for injuries caused by the igniting of the combs while she was having her hair dressed.

In that case, the Massachusetts judicial court ruled that "a person who sells an article which he knows is dangerous to human life, limb or health of another person who has no knowledge of its true character, and fails to give notice thereof to the purchaser, is liable for damages to a third person who, in the exercise of due care, is injured by it in the use for which it is intended."

After enumerating a dozen specific and often costly steps routinely taken by chemical companies before putting new products on the market, Insurance Manager N. H. Munson of Dow Chemical warned:

"Unfortunately, all of this is still not enough. The increasing number of claims is obvious evidence that our efforts are by no means 100% effective. And no one can predict what further new interpretations of law may make us even more vulnerable than we now are."

One of the questions following the panelists' discussion concerned the status of product liability in other countries. The speakers agreed that this has been no great problem up to now, but that "the honeymoon is about over."



CW PHOTOS-W VECCHIO

Moderator: Wyandotte's Dentzer.



Speaker for insurers: Hartford's Schoen.



Looking at the record: Merck's Lander.

Manufacturers' views: Dow's Munson.



New Figures in Fibers

Two companies are moving into polypropylene fiber production and one is getting out. But all three agree that the fiber has a big future.

Canadian Celanese Ltd. (Montreal) has put its Drummondville, Que., polypropylene plant into commercial production at 2 million lbs./year. Hercules Powder, major U.S. polypropylene resin producer, has moved into fiber production by buying Industrial Rayon Corp.'s Covington, Va., plant (CW, Nov. 26, p. 41).

And Industrial Rayon—the company getting out—says it has confidence in the future of the fiber, but that full-scale commercial entry would involve substantial losses before profits began—too much for troubled IRC to bear. The clincher: Hercules' offer for the plant (\$7.5 million), which was too good to turn down.

Three other U.S. manufacturers are —or soon will be—making polypropylene multifilament fibers. Beaunit Mills (New York) is in production, Reeves Brothers (New York) expects to be in commercial production within a few months, AviSun Corp. (Marcus Hook, Pa.) will produce small amounts next year. Rogosin Industries will soon begin to produce polypropylene fiber in Israel.

Meanwhile, in Italy, Montecatini has been in what it calls commercial production since April, expects to get cloth on the market this month.

Scaling Up in Film

Du Pont—already the front-runner in fluorocarbon plastics—last week decided to go commercial in another of these products. The company's Film Dept. will add a unit to its Yerkes Film Plant at Tonawanda, N.Y., near Buffalo, to produce Teslar polyvinyl fluoride film—described as a long-lasting coating for building materials.

Teslar resin and film—on which Du Pont holds various patents dating back to about 1948—have been under development at the Yerkes Research Laboratory (also near Buffalo) for the past eight years. They have been in production on a pilot-plant basis for nearly two years (CW, April 11, '59, p. 87).

The new commercial-size unit—described only as a multimillion-dollar

project—will produce both the resin and the film, using vinyl fluoride produced by Du Pont's Chambers Works (Deepwater Point, N.J.). Construction is to begin early in '61 and be completed by mid-'62, with Du Pont's Engineering Dept. handling both design and construction.

For the next year or two, the PVF resin is expected to be used only in the film. The company says it has no present plans for putting this resin into fibers or molding compounds, but has looked into such uses and is "not closing the door on any of them."

Teslar film's future, as seen now by General Manager Donald F. Carpenter of the Film Dept., is tied to its durability, its ability to be bonded to wood or metal, and the fact that it can be priced much lower than other fluorocarbon resins with similar properties. Right now, its development-stage price is \$5/lb., and Carpenter anticipates a reduction when the commercial plant comes onstream.

Major applications for the new Teslar film—based on its ability "to withstand outdoor exposure for many years" and its abrasion resistance—are expected to be in the construction industry as a surfacing material for prefabricated commercial building panels, prefinished residential siding, and industrial roofing. Du Pont says the film can be laminated to aluminum, galvanized or aluminized steel, plywood, hardboard and other building materials.

Teslar will be offered in either clear and transparent or opaque and pigmented forms, and with either glossy or satin surface. Du Pont adds that it can be readily vacuum-formed, drawn, metalized, heat-sealed, and adhered to other materials. It has been successfully tested as a covering for outdoor prefabricated pipe insulation and can be used as a base for pressure-sensitive tapes.

This will be the first instance of the Film Dept.'s producing its own resin. The Yerkes plant already produces cellophane, polyethylene film, Vexar plastic netting, and Cel-O-Seal cellulose bands. The Film Dept. brought a new polyethylene film plant onstream last May at Richmond, Va., and aims to complete a new Mylar polyester film plant next spring at Florence, S.C. It started commercial production of Teflon 100 FEP film at Buffalo early this year (CW, Jan. 16, p. 65).



Panama's Bazan: Leading 'crash program' to lure more U.S. investors.

Pep-up in Panama

With its attraction for U.S. companies tarnished by the recent anti-U.S. demonstrations in the Canal Zone and by the mounting instability throughout the Caribbean area, the Republic of Panama has launched a new program to lure foreign investors.

Jose Dominador Bazan, one of Panama's two vice-presidents and the new general manager of the Colon Free Zone, said last week that because of fear created in the minds of many businessmen by events in Cuba, Panama has decided to sign a nonexpropriation treaty with the U.S. under the Mutual Security Act. This will permit U.S. firms to get U.S. government insurance against expropriation.

Moreover, Panama is also "looking forward to negotiations" for entering the Central American common market, which is now being formed.

Bazan also disclosed "a crash program" for increasing service facilities of the Colon Free Zone, the tiny area that serves as a duty-free re-export center and tax-free profit sanctuary for some 500 U.S. and foreign corporations (CW, March 14, '59, p. 35).

First, Panama will build shipside warehousing, primarily for lowvalue bulk cargo, later will expand facilities for processing, assembly and warehousing of high-value items for air shipment.

Says Bazan: "Our aim is to make the entire downtown city of Colon one vast Free Zone—the commercial center of Western Hemisphere trade."

rapid roundup

Rounding out the week's news of companies, expansions, and foreign developments.

companies

Thiokol Chemical Corp. (Bristol, Pa.) has received a continuation contract of \$4.9 million for production of rocket motors from the Army Ordnance Ammunition Command at Joliet, Ill. The contract is for Thiokol's Longhorn Division at Marshall, Tex., where plant changes are now under way to permit production of the Pershing propulsion system.

Minerva Oil Co. (Eldorado, Ill.) and New Jersey Zinc Co. (New York) have set up a joint venture, with headquarters at Grand Junction, Colo., to search for beryllium-bearing ores (CW, Nov. 26, p. 39). Minerva—a major fluorspar producer—has been prospecting for beryllium for two years, now has 34 claims in the Badger Flats, Colo., area. New Jersey Zinc is a leading smelting company, has nine mines across the country.

General Aniline & Film Corp. (New York) has purchased the principal assets of Grant Photo Products (Cleveland). Grant's two plants in Cleveland and Elyria, O., will be used to help GAF's Ansco Division meet demands for sensitized products and waterproofed photographic base paper stocks.

Strong Cobb Arner, Inc. (Cleveland) will discontinue its Buffalo, N. Y., pharmaceutical manufacturing operation. Only a small research staff will remain in Buffalo.

expansion

Ammonia: California Chemical Co. (San Francisco), a Standard Oil (Calif.) subsidiary, has awarded Bechtel Corp. a contract for construction of the ammonia unit at its Fort Madison, Ia., nitrogen fertilizer complex. Scheduled for completion in late '61, this 300-tons/day anhydrous ammonia plant will be the most important unit in the complex (CW, Oct. 8, p. 37). Total cost of all units is slated to be \$22 million.

Wood Pulp: Brunswick Pulp & Paper Co. (Brunswick, Ga.) will double its capacity of bleached sulfate pulp to 1,000 tons/day in a \$35-million expansion move. Brunswick will now supply bleached board to its co-owners Mead Corp. (Dayton, O.) and Scott Paper Co. (Chester, Pa.).

Polyester Urethane Foam: Nopco Chemical Co.

(Newark, N.J.) awarded two of three construction contracts for its urethane foam unit at Chattanooga, Tenn., to Mark K. Wilson Co. The third went to Armco Steel Co. Construction at the 17-acre site will be completed in mid-March at a cost of more than \$1 million.

Styrene Plastics: Monsanto Chemical Co. (St. Louis, Mo.) awarded A. Bentley & Sons Co. (Toledo, O.) a multimillion-dollar contract for its Addyston, O., styrene polymerization plant (CW, Oct. 22, p. 29). Production—scheduled for late '61—will be primarily heat-resistant and high-impact styrene resins.

foreign

Aluminum/Australia, Africa: Kaiser Aluminum & Chemical Corp. and Consolidated Zinc Corp. will form an equally owned subsidiary to develop a giant, integrated aluminum facility in Australia and New Zealand. Next year Kaiser will invest more than \$10 million to develop and expand properties now owned by Consolidated, and both companies will put in more capital later. Major projects planned for completion by '66, which will make the venture the biggest aluminum complex in the Southern Hemisphere, include:

• Developing Consolidated's bauxite reserves in the Weipa area of Australia's Cape York peninsula.

Expanding the Bell Bay, Tasmania, aluminum reduction works from 12,000 long tons/year to at least 28,000 long tons. Consolidated is buying a two-thirds interest in the plant from the Australian government, which will hold the other third.

• Building a 360,000-long tons/year alumina refinery at Weipa.

• Developing a hydroelectric power source with an initial output of 280,000 kw., using New Zealands' Lakes Te Anau and Manapouri.

Building a 120,000-long tons/year aluminum reduction works at Bluff, N.Z.

• Setting up fabricating facilities.

Meanwhile, Kaiser's huge Volta River project in Ghana is moving closer to reality after negotiations with the government ended last week. Kaiser is seeking five other major aluminum producers to join in the venture.

Pharmaceutical Sales/England: Glaxo Laboratories, British producer of antibiotics, vaccines, foods and medicinal products, reports that its consolidated sales rose 11% in the fiscal year ending June 30. Net profit: \$10.6 million.

Pulp/Egypt: The U.S. Development Loan Fund will lend the United Arab Republic \$6.7 million to build an 18,000-metric tons/year pulp plant. It will use bagasse from the sugar mills under construction at Edfu, on the Nile.



Alsynite's Aronson shows off program that will guide Reichhold's entry into consumer marketing.

Reichhold Reaches for First Consumer Sales

During the next few weeks Reichhold Chemicals, Inc. (White Plains, N.Y.) will be wooing consumers on a large scale in behalf of its newly acquired Alsynite Division (CW, Feb. 27, p. 17). This campaign marks the entrance of Reichhold into the finished-product and consumer-marketing fields.

The product that brings RCI out of its "sell industry only" shell is Alsynite, a reinforced plastic panel for awnings, room dividers, etc., made with RCI-manufactured glass fiber and polyester resins. And so far, the plan is not to hit the public with "RCI Alsynite," but to continue to emphasize the Alsynite name. Reason is not modesty, but to capitalize on a name that is a "leader in the young field of plastic panels."

In any case, RCI's move comes as a surprise to many observers. Before gaining control of Alsynite, Henry Reichhold staunchly maintained the position of being strictly a supplier of industrial raw materials. Now, RCI officials say, the time has come for the natural evolution into consumer selling; it can't be regarded as a departure from established policy.

The Campaign: And evolution or revolution, RCI is promoting its new division with no hesitation. It has already tripled Alsynite's previous advertising budget. Estimated outlay: close to \$1 million. MacManus John & Adams, Inc., RCI advertising agency for over 25 years, is directing all promotions from its San Diego, Calif., offices. The first step is a two-page spread in leading popular magazines in January, illustrating use of Alsynite panels in room decoration and building construction.

At the same time specialized journals will run ads aimed at architects, builders and designers. Industrial use will be promoted in various trade publications. Other specialty accounts to be reached include florists, trailer manufacturers, motel operators, etc. Complete construction and installation plans will be available for do-ityourself workers.

Reichhold is also "renting" trained marketing representatives from B. R. Martin Associates (Chicago) for several weeks. They will present promotional materials to the Alsynite distributors. This procedure, says RCI's advertising agent, brings in the personal touch and leaves Alsynite salesmen more time to develop new accounts, expand old ones. These representatives, all women, will call on 85 of Alsynite's more-than-200 distributors. They will outline the promotional campaign in detail and demonstrate available sales aids. This part of the campaign, already in progress, can be done for about the cost of adding a single permanent salesman. Reichhold, incidentally, is adding new full-time sales people, but it is giving no figures at this time.

Born in the '40s: Alsynite itself was originally marketed in the late '40s

RCI's Two Steps to Consumer Products

by the Alsynite Co. of America (San Diego). An outgrowth of World War II aircraft developments, it is basically a glass-fiber mat impregnated with polyester resins, both raw materials produced by RCI and its subsidiaries (see chart at right). Its uses: translucent, shatterproof window panes; awnings; room partitions; industrial skylights; patio covers; fences.

Panels come in three weight and strength categories, at prices from 43-84¢/sq.ft. Series 300 weighs 8 oz./sq.ft., is rated at greater than 200-lbs./sq.ft. resistance. It is guaranteed for color, strength, heat- and light-transmission properties for 10 years. Series 200, 6 oz./sq.ft., 150-lbs. strength, is guaranteed for five years. A third series, 5 oz./sq.ft., is rated at 70-lbs./sq.ft.

The Organization: Hubert Aronson just last week was named vice-president of Reichhold in charge of the Alsynite Division. He left competitor Filon Plastics Corp. (Hawthorne, Calif.) to take this position at RCI's White Plains headquarters. Alsynite's own San Diego offices will be directed by new President Maynard McNeil (replacing retiring John Berkson) and Vice-Presidents Francis Ambrose, Raymond Moncey and Robert Swisher. Aronson will act as liaison between Reichhold and the Alsynite officials.

The Alsynite Division has three manufacturing plants in San Diego, Portsmouth, O., and Paterson, N.J., and four subsidiaries:

- Ray-O-Lite Corp. (Atlanta, Ga.) directs franchising operations for awning manufacturers to use Alsynite panels.
- Chemiglas, Inc. (San Diego) is the research and development center.
- Plastikool Awning Corp. is a Miami, Fla., fabricator and distributor.
- Everlite Corp. (Seattle, Wash.) manufactures panels under its own brand name, Everlite, technically in competition with Alsynite. It distributes only in the Pacific Northwest, however.

Reichhold owns facilities for all operations of Alsynite production. Phthalic anhydride for the polyester resins is now produced at Elizabeth, N.J., Azusa, Calif., Detroit, Mich., and soon at Newark, O. Glass fiber comes



from RCI's newly acquired Modiglass Division (CW, April 30, p. 13).

Although gaining control of Alsynite assures RCI of a market for its raw materials, says Aronson, it does not intend to cut down Alsynite's purchases from other sources. Increasing panel sales volume will boost total demand, he says, and the raw-material share obtained from the various suppliers will not be changed.

For The Future: Already Reichhold is working to expand its Alsynite distributor operations. New franchises have been established in Canada and Australia, will be set up in 25 other countries soon. Plans are also being studied for foreign production of Alsynite, although no details are discussed outside the company.

Reichhold has taken the first step now in developing consumer selling operations. If Alsynite returns RCI's investment profitably—and Aronson expects a similar million-dollar ad budget for '62—more marketing programs of this scale could be a solid help in RCI's drive to move present \$100-million/year sales to its \$500-million/year goal in '70.

New Multiwall Sack

Raymond Bag Corp. is now promoting the latest addition to its line of multiwalls—a sack featuring a conventional paper outer construction with a complete seamless polyethylene tube sewn (heat-sealed above the sew line) into the bag.

The new bag represents one more step in the marrying of polyethylene and paper to provide low-cost, highly moisture-resistant bags.

According to Raymond, the new sack does the same job as self-supporting polyethylene shipping sacks (CW, Feb. 20, p. 35) but with far less wall thickness, and presumably lower over-all cost.

Tubes of 2 to 4 mil-thick polyethylene are currently being used in the sacks, but only flat-tube types are being produced. Raymond says the bags cost about the same as those with hand-inserted liners.

Several major chemical producers have used the bags so far. Their reaction: it will likely be a stiff competitor of the all-poly sack for handling ammonium nitrate. Reasons: lower cost, lesser tendency to open along the heat-seal line.

Road Safety Challenge

The safety of hauling large quantities of chemical materials over the nation's highways was seriously challenged last week in two separate moves by state officials.

The California Public Utilities Commission ordered an investigation into the use of collapsible rubber and plastic tanks for hauling a variety of corrosive and flammable chemicals and petroleum products in that state.

Meanwhile, Major Carroll Shaw, Connecticut's deputy state fire marshal, told a meeting of the National Fire Protection Assn. in Columbus, O., that current Interstate Commerce Commission regulations governing the movement of chemicals on the nation's highways are deficient, need immediate tightening.

Biggest weakness in ICC regulations, says Shaw, is the lack of control over small cargoes. Cargoes weighing less than 2,500 lbs. do not require exterior markings but can still cause considerable damage in a fire or accident, says Shaw, especially when fire fighters don't know of their presence.

What's needed, he says, is a system of readily recognizable and easily understood truck markings to warn the public. Such a system is entirely feasible, and, according to Shaw, "something must be done about it right now."

The California investigation stems from concern in that state that current regulations on trucking of chemicals are not adequate to cover the increased hazards of handling petroleum products, solvents, acids, caustics and other chemicals in collapsible rubber tanks (CW, Oct. 29, p. 57). No date has been set for the public hearing.

DATA DIGEST

- Refractories: Brochure discusses refractory raw materials, sources, quality control and applications. Harbison-Walker Refractories Co., Pittsburgh 22, Pa.).
- Gas Mixtures: New catalog includes property tables for various gas mixtures, including hydrogen, oxygen, nitrogen, ethylene, argon. Ohio Chemical & Surgical Equipment Co. (1400 East Washington Ave., Madison 10, Wis.).
- Asbestos Fiber: New booklet gives step-by-step descriptions of 15 standard test procedures for evaluating physical characteristics of asbestos fibers. American Smelting and Refining Co. (120 Broadway, New York 5).
- More Acrylic Emulsions: Bulletin (No. 7) gives detailed information of a seven-year study of formulations, applications and exposure tests of exterior paints made with a 100%



New Bulk Shipping Contender

Kaiser Industries Corp. last week introduced its candidate for the fast-growing bulk shipping container market. Its name: Nest-A-Bin. The versatile containers are available in aluminum, magnesium or steel, with special organic coatings where needed. Two types are now in production—a liquid-

containing model (left) with capacities of 440, 550 or 660 gal., and one for granular materials (center) with product capacities of 54 or 70 cu.ft. Tare weights average about 200 lbs. and the bins cost \$340 in single-unit quantities. The bins nest together for compact return shipment.

Planning for our growth (and perhaps yours) at Pittsburgh Chemical

Since its corporate birth early this year, Pittsburgh Chemical Company has moved steadily ahead in its program of production and marketing growth.

If growth is our life blood, we think it's the life blood of our customers, too. That's why we concentrate so much of our own planning in the area of better customer service and assistance.

Pittsburgh Chemical is proud of its reputation as a reliable basic producer of high quality industrial chemicals and chemical products. But we gain much more satisfaction when a single customer tells us that our sales and technical service people helped him reduce costs, improve a production process, or increase his profits. When that happens, we're both growing . . . and you'd be surprised how often it does happen!

Perhaps this unique Pittsburgh plus can contribute to your growth program. Write, wire or phone us by our new name—Pittsburgh Chemical Co.—and watch things happen . . . for you!



A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.



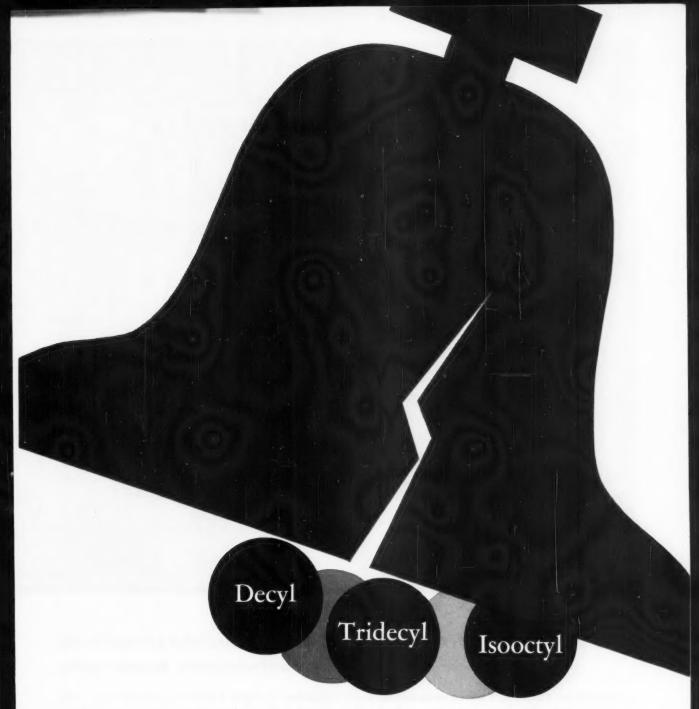
INDUSTRIAL CHEMICALS . ACTIVATED CARBONS . PROTECTIVE COATINGS

Regional Sales Offices: Pittsburgh • New York • Nashville • Chicago • Houston • Los Angeles • San Francisco



acrylic resin emulsion. Rohm & Haas Co. (Philadelphia 5).

- Lead Sound Barriers: Engineering report tells how to calculate effectiveness of partitions, including use of lead in combination with other insulating materials. Lead Industries Assn. (292 Madison Ave., New York
- Plastics Stabilizer: Brochure describes deterioration of polyethylene, polypropylene and polyvinyl plastics in the presence of light and oxygen, and the effect of a new stabilizer. Guardian Chemical Corp. (38-15 30th St., Long Island City 1, N.Y.).
- Catalysts: New catalog lists catalysts for gas processes, petroleum and chemical industries, food processing and other applications. Girdler Catalysts (P.O. Box 337, Louisville 1, Ky.).
- Plasticizers: New booklet (No. 556) describes 12 plasticizers, including physical properties, tentative specifications and test methods. Chas. Pfizer & Co., Inc. (630 Flushing Ave., Brooklyn 6, N.Y.).
- · More Stabilizers: Technical data sheets describe physical properties, and applications of stabilizers for plastic films and coatings. Advance Division, Carlisle Chemical Works, Inc. (New Brunswick, N. J.).
- Pharmaceuticals: New catalog gives technical information for more than 200 pharmaceuticals and chemicals. Conray Products Division, Chemical Service Corp. (129 Pearl St., New York 5).
- Fine Chemicals: New folder lists 175 fine chemicals for the pharmaceuticals industry. Mann Fine Chemicals, Inc. (136 Liberty St., New York
- Ether Esters: Technical bulletin describes methane tetrakis-4-oxopentanoates, a new group of ether esters. Delaware Chemicals, Inc. (P.O. Box 148, Wilmington, Del.).
- Phthaloyl Chlorides: Bulletin (No. 827) outlines specifications, physical properties and uses for terephthaloyl and isophthaloyl chloride. Hooker Chemical Corp. (Niagara Falls, N.Y.).
- Radioisotopes: Bulletin (No. 587) gives information and data on tagged radioactive tracers, compounds, sources, handling equipment, instruments, consultation on nuclear problems, and environmental testing. Nuclear Corp. of America (2 Richwood Pl., Denville, N.J.).



Soon...oxo alcohols from Gulf's new plant at Philadelphia

When Gulf's new Philadelphia oxo plant goes on stream early next year, you will have a new source of isooctyl, decyl and tridecyl alcohols—today's key building blocks for vinyl plasticizers, detergents, synthetic lubricants and countless other exciting new products.

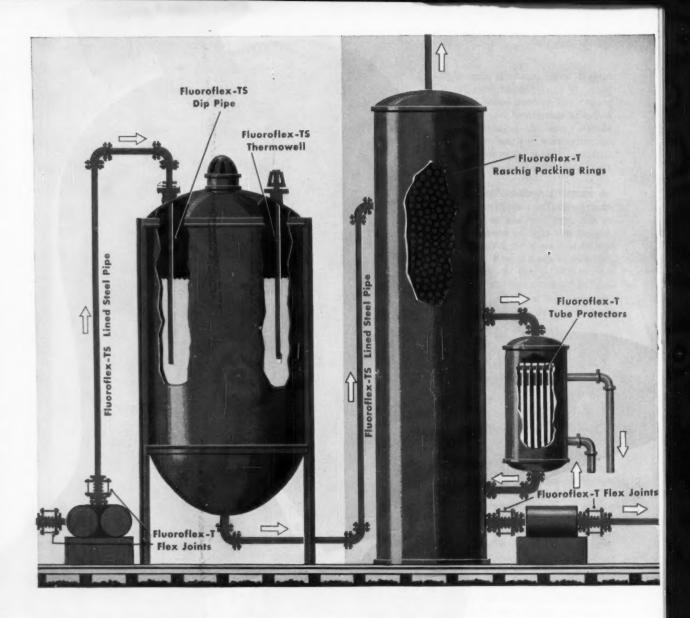
This facility was designed to produce all three of these oxo alcohols to standards that have made Gulf petrochemicals pacemakers in the industry. The plant's strategic location means faster deliveries to your doorstep . . . its capacity can supply your largest volume needs.

So, however you make or use any kind of alcohol-based product, you'll find Gulf's expanded oxo alcohol capacity much to your liking. You can get additional information at our Sales Office, 360 Lexington Ave., New York 17, New York.



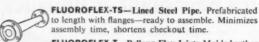
Quality Petrochemicals to Begin with

Benzene · Cyclohexane · Ethylene · Oxo Alcohols · Propylene · Propylene Trimer and Tetramer · Sulfur · Toluene Petrochemicals Department, Gulf Oil Corporation, Pittsburgh, Pennsylvania



HERE'S WHY corrosion-proof fluid-handling production savings,

Check these Fluoroflex-T piping components for economy, installation ease, long life!



FLUOROFLEX-T—Bellows-Flex Joints. Molded rather than machined, for unparalleled flex life. Damp out equipment vibration, adjust to longitudinal and temperature movements, add years to life of equipment and pipings.

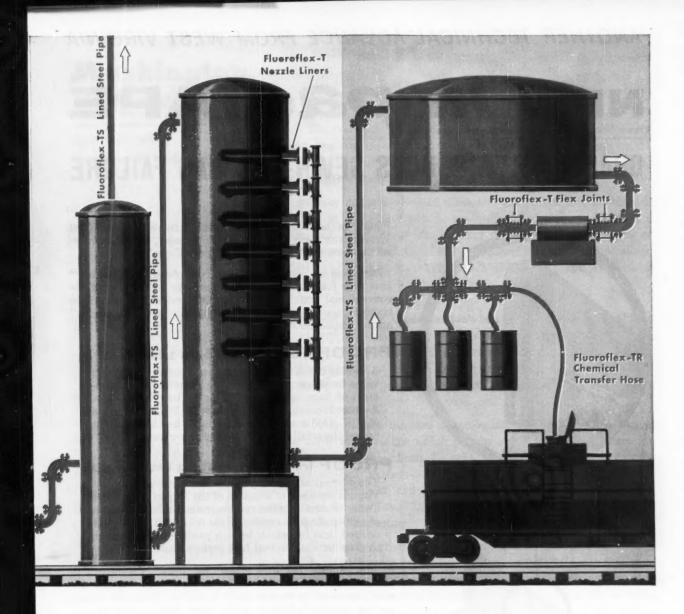
FLUOROFLEX-T—Transfer Hose. Completely corrosion-resistant, long flex life. Cover of rubber or stainless steel braid.

FLUOROFLEX-T—Condenser Tube Protectors. Eliminate erosion and corrosion by high-velocity acid on entry side of condenser tubes.

Also: Raschig Packing Rings • Dip Pipes • Spargers • Thermowells.

Fluoroflex®-T Piping Products as shown above can be used with complete and proven assurance that they will not corrode or build up solids which can contaminate sensitive products. Specially processed of Teflon® resins by patented Resistoflex methods, they can handle the most difficult materials up to 500°F. They are completely resistant to any chemical except high-temperature fluorine and the molten alkali metals.

Fluoroflex-T Piping costs no more on an installedcost basis than other corrosion-proof systems in common use today. Initial material costs have been



components of FLUOROFLEX-T (TEFLON) assure non-contamination:

lowered by recent price reductions made possible by advanced technology and increasing volume. Installation costs are inherently low as a result of skillful design which features easily-bolted-together units with prefabricated, flanged sections.

Fluoroflex-T Piping costs LESS on a performance basis. Savings in operation are assured—with decreased maintenance, long service life, and the elimination of process headaches and downtime.

So, if you have problems of corrosion—want to reduce maintenance or replacement costs and elimi-

nate process downtime or product loss—consult Resistoflex. Write for more information today.

RESISTOFLEX

CORPORATION

Complete systems for corrosive service

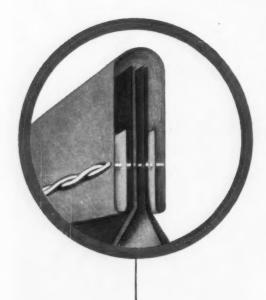
Plants in Roseland, N. J. • Anaheim, Calif. • Dallas, Tex.

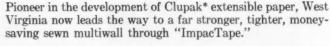
Sales Offices in major cities

Fluoroflex is a Resistoflex trademark, reg. U. S. Pat. Off.
 Teflon is Du Pont's trademark for TFE fluorocarbon resins.

NEW Impactape

DRASTICALLY REDUCES SEWN-END BAG FAILURE





ImpacTape is a revolutionary new type of sewn tape closure** that adds four layers of tape to the sewn end instead of the conventional two. This provides 49% greater toughness than standard sewn 70-lb. tape closures plus a new "cushioning" against impact shock.

PROOF from actual field trial

A leading cement company had an unusually high sewn valve breakage rate of 1%. They packed a trial shipment of bags, using West Virginia's new ImpacTape. Average breakage rate went down to .3%—a reduction of 70%. Dollar savings from reduced breakage will far exceed the small upcharge for the new closure.

PROOF from new testing technique

The development of ImpacTape was hastened by West Virginia's successful adoption of the Impact Resistance Tester to measure sewn end toughness under conditions of sudden shock. It represents the only sewn closure test devised thus far which bears a predictable correlation to drop tests and actual field performance.

Studies indicate that 70% of sewn bag breakage ordinarily is at the sewn closure, even on Clupak paper bags, because the sewn closure is the weakest point in the bag. Often this breakage was incorrectly blamed on the paper. Now stronger ImpacTape opens the door to profits from the greater toughness and possible basis weight reductions which Clupak paper is delivering to thousands of users. This is realistic research achievement—aimed straight at reducing your total packaging costs.

For a brochure giving detailed information, write and tell us whether you use sewn open mouth or sewn valve bags. Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N. Y.

*Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.

**Patent Pending.



West Virginia
Pulp and Paper

Washington

Newsletter

CHEMICAL WEEK
December 3, 1960

The National Aeronautics and Space Administration will award a contract, possibly this week, for its liquid hydrogen requirements on the West Coast through 1966. The rocket fuel will be used for launchings at the Pacific Missile Range at Pt. Arguello, Calif.

Three companies—Shell Chemical Co., Linde Co. Division of Union Carbide, and Air Products, Inc.—submitted bids to NASA. Bid invitations called for the production and delivery of these amounts of liquid hydrogen: June to Dec. 1962, 4.4 million lbs.; 1963, 12.8 million lbs.; 1964, 14.3 million lbs.; 1965, 14.7 million lbs.; and 1966, 14.2 million lbs.

Food & Drug Administration's ban on Red No. 1 food coloring upsets industry. Dye makers say there is no entirely adequate substitute. Red 1 is the "reddest of the reds." It is widely used in frankfurter casings, maraschino cherries, mouthwash and, in combination with other reds, in a large variety of other products. Other reds still usable—2, 3 and 4—have a bluish tint.

FDA banned the coal-tar color last week under provisions of the new color additives law which permits swift action where there are grounds to suspect toxic effects. Evidence that Red 1 causes liver damage and death in test animals—and possibly cancer—was revealed at a meeting of government and industry representatives discussing implementation of the new law. FDA had just concluded 15 months of testing the day before the meeting.

Ordinarily, another six months of testing should be enough to establish safe tolerance levels. But findings include evidence that some test animals developed cancerous tumors. If these are eventually linked to the color dye it would have to be banned completely under the so-called Delaney Amendment. It could take as long as seven years to finally dispose of the cancer question.

Results of the FDA experiments showed that of 250 rats fed diets containing varying amounts of Red 1, 116 died and many suffered liver damage. But FDA took the "reasonable" approach in allowing industry to use up existing stocks, on the grounds that the dye does not appear to be highly toxic in small doses. Last year FDA certified 125,867 lbs. of Red 1.

Meanwhile, after conferences with industry, FDA has drafted proposed procedural regulations—what kinds of tests are necessary, fees, time limits—but has not yet made them public.

Office of Saline Water officials defend the contract given to Asahi Chemical Industries Co. of Japan for construction of a \$482,200 electrodialysis plant at Webster, S.D., to convert brackish water (CW

Washington

Newsletter

(Continued)

Washington Newsletter, Nov. 26). Asahi will fabricate membranes and spacers, with Austin Co. of Cleveland building the plant under Asahi's direction.

The Cambridge, Mass., firm of Ionics Inc. had gotten most of the government research money for development of the process, but its bid was substantially higher than Asahi's even after buy-American provisions. Ionics officials protested to OSW that their offer was technically more sound, but government engineers went over the Asahi bid "with a fine-tooth comb," in their words, and found it completely satisfactory.

Actually, Asahi's share of the construction contract is only \$24,112, and a good bit of that will be spent in this country for materials from Dow Chemical.

The National Conference on Water Pollution set for Dec. 12-14 is getting the "so what" treatment from Congressional Democrats who feel that what is needed in water pollution is action, not more conferences. But they think the conference has some value in getting industry behind whatever program Congress comes up with.

Chairman Charles A. Buckley (D., N.Y.) of the House Public Works Committee has told conference officials he does not oppose the conference but feels it is unnecessary. He says Congressional hearings have long since developed all the information needed on which to base action. Moreover, Democrats think the conference is likely to come up with recommendations more modest than the legislative blueprint the committee already has in mind.

Committee Democrats are ready to go with a bill to step up construction grants for sewage treatment plants from \$50 to \$100 million a year (vetoed by President Eisenhower this year), increase administrative grants to state and interstate programs from \$3 to \$5 million, boost enforcement authority, establish a half-dozen regional laboratories, and make water pollution an independent office outside the Public Health Service.

The conference will include a healthy sprinkling of representatives from the chemical industry, including: John A. Zapp, director of Du Pont's Haskell Laboratories; Thomas J. Powers, Dow Chemical's manager of waste control and water utilization; and Albert E. Forster, president of Hercules Powder Co.

Public support of funds spent for pollution control is cited by HEW Secretary Flemming as a result of bond authority voted by citizens in the recent election. Four cities ordered to comply with federal directives to build treatment plants—Kansas City, Mo., Kansas City, Kan., Omaha, Neb., and Portland, Ore.—voted \$100 million total. Three other cities not under the enforcement gun—San Diego, Philadelphia and San Francisco—approved \$70 million for sewer system bonds.

2/UTA

ORLD'S SOLE BASIC GUARANTEED

SPECIFICATIONS





BZURA CHEMICAL COMPANY INC.

news briefs...

ON THE CREATIVE USE OF MCP PROCESS MATERIALS

Oil Well Drillers; higher yields without costly treatment when using MCP's improved Attapulgus Drilling Clay

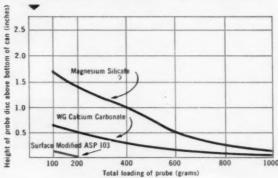
Gyp, salt, oil emulsion, and completion muds -MCP's Attapulgus Drilling Clay is lower-cost than bentonite in just about any drilling mud. Why? Substantially higher yields, and continued stability in the presence of field contaminants without requiring costly chemical treatment. Graph shows evidence of comparative performances in gyp solutions. Viscosity and water loss rate of the Attapulgus Drilling Clay suspension is practically unchanged, from initial makeup in fresh water throughout continued build-up of gypsum concentration. However, the bentonite suspension solution shows a steady loss in viscosity and increase of water loss rate. Get the rest of the story on MCP's improved Attapulgus Drilling Clay . . . check the coupon . . . it will bring you TI-552, a 12-page bulletin just off the press.

*Paint Makers: get fine grind quickly, superior suspension with Surface Modified ASP® extender pigments

Required fineness of grind in shortest time, long shelf life are assured for organic surface coating systems using MCP's Surface Modified ASP 103...graphs present proof. Other benefits: stability, weatherability, color integrity — ASP's are water-washed to uniform particle size and shape, virtual chemical inertness. There's much more to the role of ASP's in surface coatings...this is a starred item... use the coupon.

Patton Pigment Settling Gauge measures settling characteristics of paints. A weighted probe passes down through paint in quart can, at half-minute intervals distance above bottom is read and load increased. Readings provide a profile of settled pigment.

Results of Patton Pigment Settling Gauge tests on three formulations.‡ Each formulation was ground 5 hours and set on the shelf for 35 days. Then the settling characteristics were measured. Interpretation of results: The higher the reading, the more settling and the harder the body of settled pigment. In the ASP 103 formulation, the weighted probe went completely through the paint to the bottom of the can with minimum weight, in minimum time.



Minerals & Chemicals Philipp

Leaders in creative use of non-metallic minerals

Export Department: Room 150, Garden State Parkway, Menlo Park, N.J. (Cable Address: "MICOR")

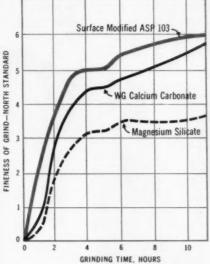
İGrinding Formula

Iron Oxide, Brown	150 grams
50% Alkyd Solution.	178 grams
Minerals Spirits	118 grams
ASP 103	170 grams

or Calcium Carbonate 178 grams or Magnesium Silicate 188 grams (equal volumes)

Comparison of rates for achieving fine grinds for three formulations.‡ Results with the ASP 103 formulation prove the case for achieving shorter grinding times, lower costs.







Waxes give up last traces of odor, taste to Porocel® adsorbent

More top quality waxes are produced . with MCP's Porocel than with any other adsorbent. Porocel is in this top position because of its superior efficiency for finishing waxes . . . even highly-hydrogenated waxes benefit from a final clean-up by Porocel. Paraffin waxes, micro-waxes, and petrolatume give up color bodies and lose organic acidity to meet the tightening specifications imposed. Get the complete data on Porocel adsorbents . . . use the coupon.



Use this quick / your product interest . . .

two-check coupon & what you need to get tests started ... we'll fill your request immediately.

For more data, see your 1960 Chemical Materials Catalog, Pages 423-430





Printing Inks with ASP's give printer the clarity and finish he seeks

With a choice of the new surface modified organophilic grades or the unmodified hydrophilic pigments, more printing inks now benefit from the superior soft texture, ease of dispersion, suspension properties, and economy of MCP's ASP aluminum silicate pigment extenders. They're grit-free, fractionated to narrow particle-size ranges to give that performance. Look into the ASP's . . . use the coupon.

MINERALS	&	CHEMICAL	S PHI	LIPP	CORPORATIO	NC
8246 Essex	Tu	rnpike, Menla	Park,	N. J		

8246 Essex Turnpike, Menlo Park, N. J.
I'm interested in:
□ * Paint Extender Pigments; □ Attapulgus Drilling Clay;
☐ Printing Ink Extenders;
Porocel adsorbents for (specify use).
Please send me, without obligation:
☐ data; ☐ samples; ☐ prices; ☐ technical representative
name
title
company
address
city zone state

GAYLORD DIGS DEEP INTO PACKAGING PROBLEMS

Excavation marks the spot where packaging problems exist—because Gaylord is digging for solutions, with a determined crew of researchers and developers. The more Gaylord solutions, the fewer problems for you.

Find out where your packaging profit is buried. Call your nearby Gaylord Man. He knows containers—in depth.





CROWN ZELLERBACH CORPORATION
GAYLORD CONTAINER DIVISION



IN CANADA - CROWN ZELLERBACH CANADA. LTD. VANCOUVER. B. C.

HEADQUARTERS. ST. LOUIS PLANTS COAST TO COAST



Equipment sellers now offer multicomponent packages in addition to individual pieces of equipment.

Equipment Buyer's Choice: Parts or Parcel

Within the next few months, chemical plant equipment buyers will be making the choice shown above more often than at any time in the past. Faced with sagging profits, most equipment manufacturers offering more than a single line of equipment are out to sell equipment packages rather than pieces. The lure: lower over-all cost. And if the trend continues, it could change equipment buying habits.

Just as complete packaged plants have gained favor because of lower design, engineering and construction costs (CW Report, Sept. 20, '58, p. 101), equipment packages* are expected to do the same, in the eyes of some equipment firms. "We can take out a lot of the design contingencies that tend to creep in—the pieces here and there that are oversized by engineers who aren't quite certain that the

* The equipment package may be almost any type and quantity of equipment, short of a complete chemical-processing unit. Examples: water-treatment units, dust-collecting systems, solids-handling systems, power-distribution systems, a boiler or gas turbine with auxiliaries, a pump and tank that are tied together.

design will meet performance," says one equipment maker.

"The package is a tighter design because it is easier to integrate individual pieces made by the same supplier than to fit together pieces from a number of suppliers. And the package cuts field construction costs, because it is shipped as a unit that requires a minimum number of hookups," says a Midwest equipment supplier.

But, convincing as these arguments seem to be, equipment packaging may face a considerably rougher road to favor than the packaged plant—a road that's certain to be difficult to chart for both buyer and maker of equipment.

Cost vs. Performance: Unlike the packaged plant, the equipment package can usually be broken down easily into its individual pieces. Item-foritem comparison with competitive pieces of equipment is possible. An equipment maker may hang an attractive price tag on his package, but the

buyer may spot individual items that don't measure up to competition on a performance basis—and that can be enough to break up the package sale.

For example, one reason why instrument engineers give for their resistance to electronic control systems is that individual items in the supplier's package may not measure up to those of a competitor. And because the electronic control systems on the market today operate on different signals, the interchangeability of parts that helps make pneumatic controls popular isn't possible. The buyer is restricted to choosing between complete electronic control systems.

Some equipment makers brush the example aside as a special case. But others don't deny that the equipment package may have items buried inside that aren't competitive, are just being carried along. "It is just another form of price cutting to help individual equipment items retain their share of the market," says one engineer.

"The equipment package may be a

better buy now. But in the long run the customer has to pay extra for it," says an equipment maker. He cites an example from his own files: "We made a complex item of equipment that because of improvements in technology suddenly required simple auxiliaries. It was logical for us to make the auxiliaries as part of an equipment package. But as soon as the volume grew large enough, back-alley shops that could easily make the auxiliaries sprang up all over the country. And with their low overhead they beat the pants off of us."

Volume a Key: If high volume seems to be the key to putting equipment makers out of equipment packaging, low volume may be the key to getting them back in, because it can help carry high engineering overhead. Packaged deals became a noticeable factor on the equipment scene during the business dip that began in late '57 and carried through '58. "There was a relaxation for a time after that, but now they are beginning to become a factor again," says one equipment maker.

It is no secret that the lower business volume, coupled with high engineering overhead has been making things rough for some equipment makers lately. "I've never seen so many firms up for sale," says the manager of one large equipment company.

The chemical process industries have helped put the equipment makers into their present position, according to some. But whether or not this is true, CPI firms haven't endeared themselves to equipment suppliers because of the penchant for getting free engineering services during equipment bidding, then farming out the job to the back-alley shop once engineering has been completed (CW, March 14, '59, p. 85). CPI firms are the "worst offenders," says one equipment salesman.

Some equipment firms have thwarted the move to the back-alley shop with reasonable success by charging for services that don't lead to eventual purchases. The offering of equipment packages seems to be a way to spread engineering services for a particular job over a broader base, and help overcome the back-alley shop's price advantage with an attractive price for a multiple-unit installation.

Two Horses: Equipment companies can't, however, solve all their problems by offering equipment packages. As one chemical company engineer puts it: "Are they in the machinery business or the systems business? They can't ride two horses at the same time."

Among the problems: to offer an integrated equipment package, the company must make a broad line of equipment, or include other firms' equipment in the package. Some firms have diversified into allied equipment lines through acquisition. In this way they can spread their risk, at the same time use their engineering know-how to help in the allied field.

But the equipment firms have another problem. When they begin to supply packages they begin to take on the look of an engineering firm. And the engineering firms are often their best customers. "We're walking a tightrope in the area between the engineering firms and the machinery manufacturer," admits the manager of one firm that is now offering equipment packages. Some of the companies even shun the words "package" and "turnkey" because they don't want to present an engineering-firm corporate image.

They must also be careful in the area of patents. If they get into the systems business, actually develop a process, they cannot obtain process patents that specify the use of their own equipment. They must be satisfied with a process patent or an equipment patent.

Engineering Battle: To the small chemical company, the engineering look that an equipment firm may take on, has attractions. It can augment its own small engineering staff, perhaps reduce the need for relying on an engineering consultant. But in the larger chemical company, the equipment maker may find a certain hostility: he often has to sell his newly acquired muscles to the chemical company's engineers who may see them as a threat to their own security.

The equipment maker seems to have no easy road to travel. He must have the courage to get into the systems business at the right time, tread lightly in the engineering company's domain, then get out at the right time. And the chemical company must be able to gauge which buy is best at any given moment—the equipment package or the individual pieces.

EQUIPMENT

Electrical Tape: Permacel (New Brunswick, N. J.) is out with a new pressure-sensitive tape for electrical wire splicing that remains flexible at temperatures as low as —50 F. The tape, designated Permacel 295, is also serviceable at operating temperatures to 180 F. It is available in 36-yd. lengths in ½-in. and wider widths.

Valve Operators: The Crane Co.'s industrial products group (Chicago) is offering a new universal-type cylinder operator for outside-screw, yokegate and pulp-stock valves. The cylinder is double-acting, operated by water, air or oil. It can be factory-installed; also comes in kit form for field installation in 30 minutes or less. Fixed orifices in the cylinder ports maintain a 1-in./second operating speed. Tube and seals are made of Teflon to prevent attack by hydraulic fluids, water, air and other gases.

Filter Aid: Johns-Manville Corp. (22 East 40th St., New York 16) says its new Celite 560, diatomite filter aid, permits a flow rate nearly double that of previously available materials. It makes possible the filtration of viscous materials that could not be processed with filter aids because of low permeability.

Plastic Pipe Joining: Tube Turns Plastics, Inc. (2929 Magazine St., Louisville 11, Ky.), is offering a new, portable heating tool for bonding solvent-resistant, thermoplastic pipe and fittings. The heater can be used on materials such as Penton chlorinated polyether, polypropylene and polyethylene. The bond is said to be leakproof, can be made in a few seconds, be ready for immediate use. The heater operates on 110-v., 60cycle ac., weighs less than 10 lbs. Two sizes are offered, one for pipes up to 21/2 in. in diameter, the other for pipes to 6 in.

Pipe Guides: A full range of pipe guides for aligning and supporting piping with bellows expansion joints and expansion compensators is a new product of Chemetron Corp.'s Tube Turns Division (224 East Broadway, Louisville 1, Ky.). The guide has a "spider," which clamps around the pipe, controls the lateral offset and



New nonionic

TERGITOL Nonionic TP-9 is a new addition to CARBIDE's long line of nonvl phenol-ethylene oxide condensates. It is similar to CARBIDE's widely used TER-GITOL NPX - except for a lower cloud point. TERGITOL TP-9 has a cloud point of 51-56°C. (124-131°F.), compared with 61-66°C. (142-151°F.) for TERGITOL NPX.



TERGITOL TP-9 is designed for both liquid detergents and dry "controlledsudsing" detergents. It is a crystal-clear liquid and has excellent grease-dispersing and low foaming characteristics.

The specification limits of TERGITOL Nonionic TP-9 are controlled for optimum results in household detergents.

SPECIFICATION LIMITS

pH of a 10% solution in water	5.0 to 8.0 at 25° C.
Water	0.3% by wt., max.
Ash	0.05 %bywt.,max.
Cloud point of a 0.5% solution in water	51 to 56° C.
Color	100 Pt-Co, max.
Odor	Mild and pleasant

For physical properties and price information on TERGITOL TP-9, use the coupon at right.

More uses for ethylene glycol

Although ethylene glycol is best known for its anti-freeze applications, it is widely used for many other purposes. For example, when esterified with polybasic acids, ethylene glycol forms resins for laminating and surface coatings. It can also be used in the manufacture of polyester fiber and films. With pentaerythritol, ethylene glycol produces alkyd resins for paints and enamels.

Ethylene glycol should be evaluated as a solvent and conducting medium for ammonium perborate, the conductor in most dry-type capacitors. It is also a valuable solvent for stains, soluble oils, resins, special varnishes and enamels, and some dyes and inks.

A 62-page booklet lists and describes CARBIDE's glycols, their properties, and scores of applications. For a copy of "Glycols," use the coupon at right.

Isobutyl alcohol and acetate reduce lacquer costs

Economy and broad utility are two important reasons for the expanding use of isobutanol and isobutyl acetate in the lacquer industry.

The following table lists some of the principal properties of CARBIDE's isobutyl solvents:

Isobutanol Isobutyl Acetate

Relative evaporation		21000000
rate (Butyl Acetate		4.48
= 100)	74	145
Dilution Ratio		
Toluene	2.4*	2.7
Naphtha	-	1.1
Relative viscosities		
of lacquers at 25°C.		
(Butyl Acetate = 100)		
N Formula	_	95
ND Formula	_	95
NRAD Formula	230*	85
NRMD Formula	_	95
Flash point (open		
cup tester), °F.	100	88
Weight per gallon		
at 20°C., lb.	6.7	7.2
*Mixture of 30% isobutanol	and 7	0% buty

acetate (98% ester)

The low specific gravities of these products give substantial savings when per-pound purchases are converted into per-gallon sales.

CARBIDE's high-purity isobutanol not only serves as a latent solvent and as a viscosity reducer, but also as an intermediate in production of ester solvents and plasticizers.

Isobutyl acetate has properties paralleling n-butyl acetate and other acetate mixtures

In addition to the attractive cost differential that goes with isobutyl alcohol or acetate, other economies are obtainable through bulk shipments with other CARBIDE solvents.

Tear out this coupon. Check the boxes on which you'd like more information, and mail to Dept. H, Union Carbide Chemicals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N.Y.

☐ Isobutyl Alcohol	☐ TERGITOL TP-9
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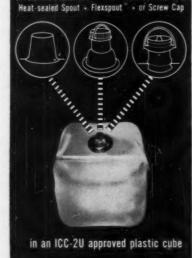
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PRODUCTION

angular rotation to which expansion joints are subjected by pipe movements and changes in pressure. Guide casings are 3 in. long for pipes 2½-in. and smaller, 6 in. long for pipes larger than 3 in.

Ball Valve: A sanitary ball valve for pharmaceutical service is a new offering of Cooper Alloy Corp. (Hillside, N. J.). The valve has an extra large port that eliminates turbulence, permits cleaning by steam and wire brush. Called Figure 8207, the valve comes in 1-, 1½- and 2-in. sizes, has a working pressure of 150 psi. at 400 F.

Materials and Refuse Handler: Dempster Brothers (Knoxville, Tenn.) has a new refuse-container handling unit that doubles as a handler for heavy chemicals and raw materials. The unit has a compaction body and cab-clearance lifting arms that can be operated as a self-loading packer when pulled up on its skid frame and locked in place.

Flow Monitor: Hastings - Raydist, Inc.'s (Hampton, Va.) new flowmeter for air and other gases operates on the mass-flow principle, compensates for changes and rate of change in temperature. With a %-in.-diameter flow tube, the unit will monitor flows from 0.003 to 1.4 cfm. Flow tubes as large as 1 in. in diameter are available.

Vibrating Platform: Cleveland Vibrator Co.'s (2828 Clinton Ave., Cleveland 13) new electric vibrating platforms can be installed on existing roller conveyors to provide settling action for materials in drums, cartons or molds. Four coil springs (which require no tuning) isolate the vibration from surrounding structures. The platform is 24-in. square, can be operated on 110 to 550 volts.

Regalvanizing: Galvanized sheds, roofs and fences no longer must be painted or replaced once the zinc coating is gone. The Carboline Co. (St. Louis 17) is out with a new inorganic zinc coating, which can be applied by brush, spray and roller to furnish galvanic protection. A single coat is 2½ mils thick, requires no solution-curing. Called Carbo Zinc 11, the coating can be applied at O F, becomes water-insoluble in 20 minutes.



how

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This is a story about FOAMS... urethane foams

POLYETHER-BASED URETHANE FOAMS, chalking up new successes and spawning new applications at a remarkable rate, are fast becoming one of industry's most exciting developments. Their low cost, ease of application, and variety of forms (ranging from supple flexibility through semi-rigid to most rigid types) have tickled the imagination of thousands. Here are some developments to date:

the widest range of desirable properties of any available industrial foam

more accurate control of degrees of toughness, resilience, weight per unit volume, shock absorbency, insulating properties

marked price advantages over polyester foams and foam rubber

a solvent-blown rigid urethane foam which can be applied with readily available standard portable hotspray catalyst equipment

But, as with all new developments, experience is an allimportant factor. It can prevent costly mistakes, fruitless evaluation, conserve priceless laboratory time, cut costs, and insure greater product satisfaction.

So, if you have an interest in urethane foams - either flexible, semi-rigid, or rigid types - consider these facts:

1. Wyandotte pioneered in the development of the polyethers that have greatly improved urethane foams, given them a longer useful life, lowered their cost, and offered a far wider range of desirable properties.

2. Wyandotte was the first to develop a sprayable solvent-blown polyether rigid foam.

3. Wyandotte has extensive urethane application and development laboratories cooperating with all manufacturers of urethane foams, and with prepolymer manufacturers on the latest urethane-foam formulations.

This valuable experience (and our facilities) are available to you if you make, wish to make, or use urethane foams as a part of your own products or processes. Just write us, describing your requirements in as much detail as possible. Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.

Wyandotte's urethane-foam raw materials include: Pluracol* Series of Triols, used for one-shot flexible foams and for the preparation of rigid urethane foams; Pluracol Diols, used for prepolymer-type flexible foams and to impart strength properties to one-shot flexible foams; Tetronic* Polyols, for improved resilience and moldability; Quadrol*, a very reactive cross-linking agent and catalyst; DHP-MP, a catalyst with extremely low odor.



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Successful protein hardening

Tanning, of which embalming is a special case, boasts an immense technical literature, being one of the oldest chemical arts. Another special case of tanning, one where the practitioners are a little more communicative than in the older special case, occurs in the hardening of photographic emulsions.

In the late C. E. K. Mees' Theory of the Photographic Process (The Macmillan Co., 1954) appears a comprehensive review of what is known about hardening and other behavior in that strange protein, gelatin. One learns there that aldehydes are important hardening agents, that a double bond near the CHO group activates the effect, that halogen substitution in aliphatic aldehydes is another hardening factor, and that these effects are piled on top of each other in mucochloric acid,

At this point reference is made to U. S. Patent No. 2,080,019. One looks up the patent and reads that both mucochloric and mucobromic acids, when incorporated in photographic emulsions do not adversely affect photographic properties while permitting them to be processed in hot solutions without melting. One notes also that this patent, assigned to Eastman Kodak Company, expired on May 11, 1954.

We do not mind admitting that in our time we have made a great deal of *Mucochloric Acid*, that we don't in the least mind selling it as Eastman 4105, that we have lately started offering *Mucobromic Acid* as Eastman 5906, that the Russians claim the latter tautomerizes to

that written this way looks like one of those multum-in-parvo-type molecules.

We had a fellow working here on mucochloric acid whose personal proteins were taking such a beating that we had to take him off the assignment. After a while he quit altogether. We read the other day that he had just been made research vicepresident at one of the nation's prominent and successful chemical companies.

The baron led the way

The great Baron Berzelius may well have sensed big game when he discovered pyruvic acid in 1835. The name comes from the Greek pyr, for fire, and the Latin uva, for grape. This figures. Pyruvic acid used to be prepared by dry distillation of taric acid. The oldtimers had it spotted as an intermediate in the fermentation of sugar. Such relationships had probably begun to look simple and straightforward.

It was just as well that no gypsy fortuneteller told the Baron that 72 years after his death, work would begin in earnest on unraveling just how grape sugar breaks down into pyruvic acid and that this work would take 40 years until the phenomenon was at last understood as the first stage in the process by which chemists and other living creatures obtain from their food the energy with which to engage in all affairs, including ratiocination about biochemistry.

Anyway, the Baron was an excellent chemist. He prepared several salts of pyruvic acid, including the lithium. Now we wish to report that we, too, can prepare *Pyruvic Acid Lithium Salt* and, in fact, offer it as Eastman 8130, a standard for use in pyruvic acid determinations. *Pyruvic Acid* is Eastman 498, vintage unspecified.

Just carbon and nitrogen

A family of Frenchmen ran a powder mill down on Brandywine Creek in Delaware. They attracted some smart chemists to work for them and branched out. The chemists attracted other chemists and they got quite a thing going.

On June 4, 1957, U. S. Patent No. 2,794,824 was granted to two of these chemists for the preparation of a compound called tetracyanoethylene, which contains only carbon and nitrogen. Tetracyanoethylene stirred up attention from chemists all over, particularly after the inventors and their buddies let on that

- though it survives 600° unchanged, when it catches fire in oxygen it burns hotter than does acetyleneoxygen;
- it reacts with compounds like dimethylaniline to give a new class of intensely colored dyes, the tricyanovinyls, that might some day go commercial for hydrophobic fibers:

- 3) it can be converted to hexacyanoisobutylene, a dibasic acid so strong that in 0.4M solution it shows pH 1.7 (as compared with pH 1.8 for sulfuric at the same molarity), with a very stable ion containing nothing but carbon and nitrogen;
- it is far speedier even than maleic anhydride at forming a ring with a diene, Diels-Alder-wise;
- its solutions in various aromatic hydrocarbons are intensely and differently colored, each characteristic of the availability of electrons from the hydrocarbon.

From across town here in Rochester came the idea of using that π -electron transfer to identify by color the spots on paper chromatograms of aromatic hydrocarbons instead of having to pull down the window shades for ultraviolet work. An oil company in Houston found that while these spots lost their color on heating, the spots from nitrogen-bearing aromatics after heating gave a new series of characteristic colors. At Yale, tetracyanoethylene captured and held for release at will the elusive compound fulvalene,

We ourselves were spawned by a snapshooting camera. One direction in which we branched out was the business of supplying organics for research and analytical use. Chemists asked us for tetracyanoethylene. We turned toward the Brandywine and asked permission to make a little under U. S. Patent No. 2,794,824. Back came a suggestion-that the Frenchmen's successors in interest make it and sell us some for resale in conveniently small quantities. Since this saved them and us and the rest of the chemical world a lot of bother. Tetracyanoethylene from Delaware is now obtainable as Eastman 7883. If you want to write them for general cyanocarbon information, we have their name and address around here somewhere.

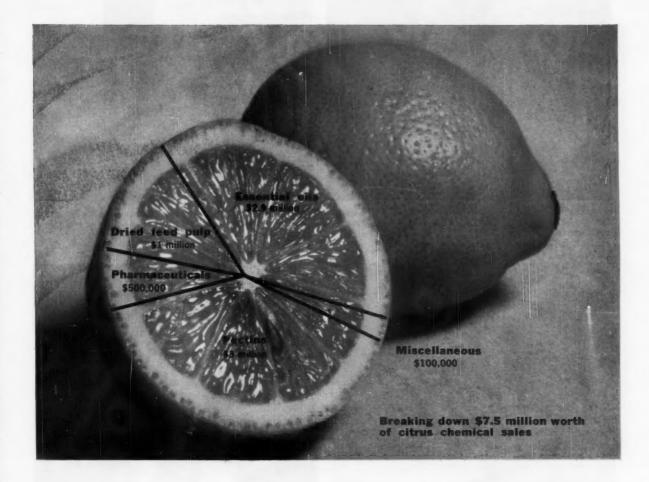
Since this is our page, and since you might want the abstract or even our new "List No. 42" which catalogs our stock of some 3800 organic chemicals, we'll print our name in nice bold italic type: Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y.



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Distillation Products Industries is a division of Eastman Kodak Company



Chemicals Cut Bigger Slice of Citrus Sales

The chemical industry will make record profits from lemons, oranges and grapefruit this year. Sunkist Growers (Los Angeles), major source of the citrus extracts, expects to ring up \$7.5 million in sales of essential oils, pectins and flavonoids by year's end. And this tidy business represents more than an outlet for excess fresh citrus; it's a "coproduct" enterprise, now that it is getting a substantial boost through the co-op's own research.

Although the main purpose of Sunkist, growers' cooperative, is to market fresh fruit, it has made the move into chemicals for two solid reasons: to utilize every possible profitable component of the fruit and to help level the profits during pricedamaging seasons when it is in oversupply. Result: about 400 products

for the food, beverage, chemical and pharmaceutical industries.

The group's two California plants—Lemon Products Division in Corona and Orange Products Division in Ontario—were once considered byproducts plants. Now, because of increasing sales volume of citrus chemicals (double in the last 10 years) and the market potential, the facilities are not regarded in the by-product class.

\$7.5-Million Bonus: The extracts, of course, don't produce the income (about \$176 million this year) that fresh fruit does. But Sunkist's sales staff of 50 in the U.S. and abroad consider it a worthwhile, \$7.5-million addition to their line, along with juice products, which contribute about \$36.5 million to Sunkist's income. The co-op's salesmen, incidentally, face varied customers. The fresh fruit is

sold through auction houses in principal cities, and also by private sale to large individual buyers, such as chain food stores. Juice products are disposed of through brokers. And the citrus chemicals are sold directly to manufacturers.

Sunkist backs its sales with a \$5million/year advertising budget for all products.

Union of Co-ops: Established in 1893, Sunkist is now composed of 10,000 growers with groves in California and Arizona, which, in turn, belong to 120 individual co-ops. Each of these co-ops owns its own fresh citrus packing house but sends surplus, wholesome fruit to Sunkist's two plants. Sunkist pays the co-op on the basis of profit from the processed product.

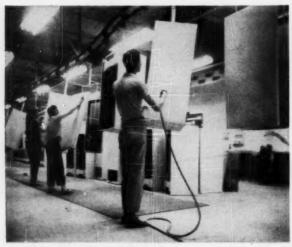
In 1920, Sunkist began its first



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studies on citrus oils, waxes, peels, pectins, celluloses, juices and seeds. Today its R & D program encompasses seven laboratories, staffed by over 100 personnel including chemists, chemical engineers and bacteriologists.

In addition to its cooperative research with the government and universities, it also uses outside research companies for some of its R & D. Medical groups are often enlisted in the development of pharmaceuticals.

Bioflavonoids are Newest: In the pharmaceutical field, essential oils of citrus have long been used for flavoring or masking. A more recent drug development has been the use of pectins and pectin derivatives. The newcomers, however, are the bioflavonoids.

Fifteen citrus bioflavonoids have been identified so far and several more have been identified but not isolated. The most important ones include hesperidin, hesperidin methyl chalcone, and naringin.

The most familiar flavonoid is hesperidin, which is produced from heavily limed orange peel and is insoluble in water, while hesperidin methyl chalcone is produced by methylation of hesperidin in an alkaline solution. Naringin, extracted from grapefruit peel, is now used in beverages as a substitute for quinine and is proposed for treating dental caries.

Athletes may well become big users of bioflavonoids. Daily doses of the citrus product and vitamin C are said to decrease the severity and healing time of soft tissue injury and to build up resistance to capillary rupture caused by heavy blows.

Some other bioflavonoid uses: to control inflammation, in treatment of cancer and rheumatic diseases, and in preventing habitual abortion.

Ungelling the Pectin: During its early commercial development, pectin was largely produced in a jelly grade for the food industry. But in recent years, new uses for pectin and pectin derivatives have cropped up in pharmaceuticals.

Some of the products in this area currently being produced by Sunkist are pectin cellulose complex, used in gastro-intestinal disorders; calcium pectinic acid amide for geriatric products; sodium polypectate as culture media in penicillin production; polygalacturonic acid as a chemical intermediary; and galacturonic acid in gastro-intestinal ailments.

Citrus Oils: Essential oils from citrus have been used by industry for more than a century. (At one time the oils, chiefly terpenes, were of such economic importance that the fruit was discarded and only the oil used.)

Although citrus oils are used in medicinals for flavoring or masking, their greatest use remains in foods—e.g., soft drinks, confectionery, baking and household extracts. Distilled oils are largely used in soaps, cosmetics and perfume.

Products of the Future: The citrus industry continually is on the lookout for new ways to utilize its fruit. Some materials, now in the experimental stage, look promising:

- Psoralen as a sunburn retarding agent in suntan preparations.
- Linoleic acid as an ingredient in margarine.
- Acetyl esterase, a citric enzyme, as a diagnostic agent for steroid metabolism.

On research of this nature, both Sunkist and the Florida citrus coops conduct much of the work on a cooperative basis with the U.S. Dept. of Agriculture, state agricultural groups, and at universities on grantsin-aid. (Research is one of the few areas of cooperation between the Florida and California-Arizona citrus growers; another concerns action on legislation that might affect the overall citrus industry.)

Most of the extraction of citrus derivatives will likely be done by the Sunkist group. In Florida, growers are not as well set up to make the derivatives. There, only a few of the large individual co-ops own juice processing plants from which the raw materials might be saved, and most of these use peels to make cattle feed. Minute Maid, one of the independent juice processors in Florida, makes pharmaceutical derivatives, but its case isn't typical.

Sunkist's R&D Manager Williard Baier feels that the citrus industry has a fertile field for research in the 150 chemicals that are in citrus fruit. "We are presently concentrating on those with the best market potential," he said, "but we are always testing other constituents and carrying our basic research results into practical areas."



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These alkyl morpholines are as old as the urethane industry and have proved their performance dependability as catalysts in polyurethane foams. Other interesting applications are extraction solvents and stabilization agents for chlorinated hydrocarbons. These materials are also suggested for use in the preparation of self-polishing waxes, oil emulsions, corrosion inhibitors, and pharmaceuticals.

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AGT's President Monte Pendleton with Vice-President A. J. Scholes.

Profit in Pane Painting

The glare in the public's eyes accounts for the gleam in the eyes of executives at American Glass Tinting Corp. (Houston, Tex.). The five-year-old company is handling \$2-million/-year sales of a coating compound that takes the dazzle out of already-installed window glass and eliminates the heat and fading caused by the sun.

The company's Sun-Glass Tinting, a Du Pont-developed liquid plastic coating, is applied by a two-man team to the interior of glass windows. The process produces a uniform coating without buffing or polishing, is said to last for 10 years in ordinary environment, indefinitely if not damaged.

Although it's not the first to get into the glass-tinting business, AGT is probably the industry's most successful company. It has poured a high proportion of sales into advertising (\$150,000 this year), has tied up with already-established supplier Du Pont for raw material and has used that name liberally in its promotion. Moreover, it has been in the right place at the right time—i.e., in a position to cash in on the popularity of glass-fronted buildings.

Partnership to President: Top man

in American Glass Tinting Corp. is Monte Pendleton, president and founder of the company. He first got into the glass-tinting business in '55 when he saw an ad offering partnership in a tinting company. He borrowed money, left his job as a salesman with Johns-Manville, and (along with Arthur Forbes) went into business with a dealer for Sun-Shield Co., a Los Angeles distributor of glasstinting material, Tint-A-Pane, made by Andrew Brown Co. Sales improved, the business made a modest profit by '56, and Forbes and Pendleton formed their own company, American Glass Tinting. In Aug. '56 Forbes decided to study law and sold out his stock, making Pendleton sole owner.

Pendleton began buying direct from Andrew Brown and set up dealers of his own in the Houston area. Later the sales territory was enlarged to include all of Texas and neighboring states.

Big Brother: As security against the possibility that a giant well-known national company might decide to develop and market a glass-tinting product, Pendleton asked Du Pont to look at the potential market for glass-tinting products. Du Pont studied the field, and in March '58 signed an



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AMINOETHYLPIPERA-ZINE is a high-boiling triamine combining a primary, a secondary, and a tertiary amine group in a single molecule. AMINE AL-2 is a lightcolored, distilled mixture of primarily heterocyclic polyamines containing about 60-65 per cent aminoethylpiperazine.

These polyamines, containing the piperazine nucleus, make excellent epoxy curing agents—impart good flexibility and high impact strength to the resin; excellent castings, laminates, and surface coatings are obtained. Suggested uses for their derivatives include corrosion inhibitors, asphalt anti-stripping agents, surfactants, and emulsion breakers.

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Fort Amanda Rd., P.O. Box 628 • Lima, Ohio Phone CApitol 5-8015 or wire (TWX call letters LIMA O 497-U) exclusive contract with AGT for worldwide distribution of the product that Du Pont would produce to AGT's specifications. The formula became the joint property of the two firms, and production was begun at Du Pont's Philadelphia plant.

The product Du Pont developed for AGT is a transparent, colored coating. It sells for \$42.50/gal., comes in 13 shades and one clear coating for thinning colors. Essentially, it's made from an alkyd resin that contains silicones for flow properties, light inhibitors, pigment dispersions and a combination of hydrocarbon solvents and driers—in short, a transparent "paint." Before coating with Sun-X, windows are washed with a compound containing 93% solvent, 7% wax.

AGT sells Sun-X Glass Tinting to dealers, who in turn sell the service of applying it. Now there are over 100 dealers in the U.S. who have invested \$5,000-15,000 in inventory to get started, and 42 export dealers. About 70-80% of the present dealers are full time; new dealers are not accepted unless they're willing to give full time to the firm. A dealer must sell a minimum of 10 gal./month if his area has 200,000 population, 25-gal./month minimum in an area with population of 1 million.

Some of the bigger jobs won by Sun-X dealers have included the Schlumberger Well Surveying Co. Building (12,000 sq.ft.) in Houston, the Finger Furniture Building (20,000 sq.ft.) in Houston, and the Arkansas Justice Building (5,000 sq.ft.) in Little Rock. Asked for a representative cost for tinting, AGT put it at around 75¢ to \$1.35/sq.ft., including both material and labor.

Consumption of the tinting plastic is expected to be almost three times greater this year than last—a climb from 8,000 gal./year to about 20,000. (A gallon of the material covers about 350 sq.ft. of glass.)

No Strain in Panes: AGT's sales rose from \$98,000 in '57 to \$175,000 in '58. In '59, when Du Pont began manufacturing Sun-X, AGT's sales spurted to a total of \$604,000. Company officials are quick to attribute this to the product acceptance of the Du Pont name. In '60, sales are expected to reach \$2 million, with a net profit of 15%.

American Glass Tinting was sixth

or so on the list of companies in the tinting business in '56. While it now has about 12 competitors, AGT believes it's biggest in the field. Some competitors include Rinshed-Mason, Sherwin-Williams, Western State Lacquer, Pittsburgh Plate Glass and Andrew Brown Co.

Although factory-tinted glass (builtin rather than coated tint) is permanent and best for many applications, AGT says that the competition from the glass makers hasn't hurt it. In glass of new buildings, where color is added to reduce glare of light or sun, the owner usually waits until he moves in to determine what color will be needed to control the glare. If the color applied is too light, AGT can put on another coating to meet the need. On the other hand, if factorytinted glass were used, the color could not economically be changed-or even lightened.

Considering the trend toward installation of glass walls—in both industrial and residential buildings—future for glass-tinting companies appears to have a rose-colored hue.

PRODUCTS

TiO₂ Dispersant: A synthetic silica pigment to disperse titanium dioxide in latex and emulsion paints is being offered by J. M. Huber Corp. (New York) under the tradename Zeolex.

Liquid Rosin Flux: A new printedcircuit flux has been brought out by Alpha Metals Inc. (56 Water St., Jersey City, N.J.) under the name Alpha 346-35. The material can be used with brass, bronze, cadmium plate, copper, lead-nickel plate, silver, solder plate, tin-zinc plate.

Antistatic Agent: Sonostat 60, a 100%-active nonionic liquid, is being marketed by Sonneborn Chemical and Refining Corp. (New York). It's intended for use on all types of wool and synthetic textiles, is amber in color and is generally compatible with commercially available processing oils.

Corrugating Starch: Corn Products Sales Co. (10 East 56th St., New York) has developed a new starch, Coragum FD, for corrugating adhesives. The product is said to produce a heavier-bodied adhesive in standard corrugating formulas.



TRY JEFFERSON

ETHYLENE CARBONATE PROPYLENE CARBONATE

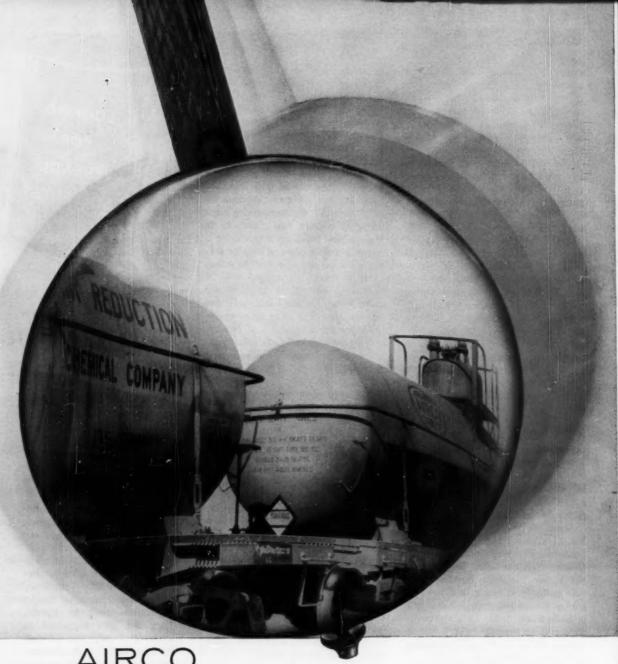
These carbonates possess outstanding solvent properties for numerous polymeric and other relatively insoluble organic compounds. Their wide compatibility with many substances makes them excellent coupling agents.

Carbamates are formed easily with ammonia and aliphatic amines, leading to applications in agricultural chemicals, plasticizers and resins. To effect alkoxylation, these carbonates can be frequently substituted where the respective oxides are inconvenient to handle. They are also suggested as selective or extractive solvents for aromatic hydrocarbons; propylene carbonate finds uses in hydraulic and other functional fluids.

The purity of both products is in excess of 99% and truck-load quantities are available on short notice. For technical information or samples, write Jefferson Chemical Company, Inc., 1121 Walker Avenue, P.O. Box 303, Houston 1, Texas.

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Technology

Newsletter

CHEMICAL WEEK
December 3, 1960

A new unit for making a new solid propellant opened at the U.S. Naval Propellant Plant (Indian Head, Md.) this week. The propellant is "just coming out of research and development," according to a Navy spokesman, and is designed for the second stage of the Polaris missile. It contains nitrocellulose, nitroglycerin, and "several other" undisclosed ingredients.

Despite heavy research on solid propellants, liquids will continue to be the answer to long-range missile fuel needs, according to Wernher von Braun. In New York for a meeting at the Chemists' Club, von Braun told Chemical Week that more research on liquid propellants is needed, compared the current status of fluorine-containing compounds, for example, with that of oxygen 10 years ago.

Effective pre-emergence control of all major lawn weed grasses is the promise of a new compound called diphenatrile, developed by Eli Lilly. Tests at the firm's research laboratories near Greenfield, Ind., demonstrate that diphenatrile controls crabgrasses, foxtails, goose grass and barnyard grass. E. F. Alder, head of Lilly plant science research, says that the compound gives 100% crabgrass control in many tests without injury to established turf and "has not injured established flowers, shrubbery or ground cover, nor has it been harmful in any way to humans, pets or other animals." One spring application at the rate of 30 lbs./acre before weed grass seeds begin to sprout gives full season protection.

A new lubricating oil additive, said to control surface ignition, rust, wear and deposits of fuel components such as lead, has been developed by Oronite Division of California Chemical Co. The new additive, called Oronite 1200 Series, is a detergent incorporating a zinc-phosphorus oxidation inhibitor; it has no ash content. Tests on taxicabs showed that the additive greatly reduced piston oil-ring clogging, nearly eliminated oil-screen clogging and at the same time held valve-chamber and oil-pan deposits to a minimum.

A thermionic-thermoelectric energy generator, which points the way to a doubling of the efficiency and electrical power output of conventional thermionic converters, is now being operated by General Electric's Electronics Laboratory (Syracuse, N.Y.).

In development work, a standard thermionic converter, which converts heat directly into electricity by liberating electrons from a hot cathode, was sandwiched with a zinc-antimonide-constantan thermoelectric generator, which operates like a thermocouple. This sandwiched arrange-

Technology

Newsletter

(Continued)

ment takes advantage of the thermionic converter's high-temperature efficiency as well as the thermoelectric generator's low-temperature efficiency. It lets the thermoelectric generator take advantage of waste heat from the thermionic generator.

Tests showed that efficiency is increased from about 2.5% to 5.6% with an output of about 2 watts. GE indicates that efficiencies up to 16% may be obtained from vapor thermionic converters coupled with lead-telluride thermoelectric generators. In such systems, the high-temperature heat source could be solar, nuclear or chemical energy, while water would provide the heat "sink" for the cold junction of the thermoelectric generator. Cascade devices such as this would be useful for power in ships, missiles and airplanes.

Heart disorder, kidney disease and headaches are the targets of three new pharmaceutical developments. The first is a new quinidine derivative for use in treating disordered heart rhythms. Conventional quinidine salts often cause side effects. The new derivative is quinidine polygalacturonate, a long-chain organic compound that disassociates more slowly than a salt, is absorbed into the blood stream more uniformly. It's offered by The Purdue Frederick Co. (New York) under the name Cardioquin.

Diagnosis of hypertension due to unilateral kidney disease is the aim of a new radioactively tagged compound called Radio-Hippuran. It's sodium iodohippurate (I¹⁸¹), a compound that is cleared from the blood stream by the kidneys faster than other isotope detectors, thus shortening diagnostic time to about 10 minutes as well as magnifying differences between the kidneys. Abbott Laboratories (North Chicago) is the producer.

Headache abatement is an unexpected bonus of a drug generally prescribed for treatment of vertigo. Chas. Pfizer & Co.'s (New York) Antivert (a combination of meclizine and nicotinic acid) is the material used by two Washington doctors in treating 134 patients suffering from different types of headaches that had not responded to other treatment. Of this group, 72 reported "noteworthy" reduction in severity.

Possibly the largest biologically active pelypeptide yet synthesized has been reported by C. H. Li and coworkers of the Hormone Research Laboratory at the University of California School of Medicine (San Francisco). The molecule formed is identical with the first 19 amino acids in the naturally occurring ACTH molecule, which contains 39 amino acids. Biological potency of the synthetic material is about one-third that of the natural one. Synthesis of ACTH, or of parts of it, may lead to compounds that are effective in the remission of collagen diseases (e.g., rheumatoid arthritis) without causing the natural material's undesirable side effects.

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cerium hydrate, cream to yellow colored powder, 81-83% cerium oxide

cerium metal, granular, ingots, rods, 98.6% minimum

cerium oxide, high purity, white powder, 99.8-99.9%

cerium-free rare earth chloride, cast pink lumps, 45-47% rare earth oxides

cerium-free rare earth carbonate, bluish white, 70% total rare earth oxides didymium metal, granular, ingots, rods,

78% Nd-19% Pr europium oxide, white powder, cubic or

monoclinic, 99.8% Eu₂O₃ lanthanum metal, high purity, ingot, rod, wire. 99.6%

lanthanum oxide, flesh-colored powder, 92-95%

cerium-free mischmetal, granular, ingots, rod, 98.6% rare earth metals

neodymium oxide, light blue powder, 95%, 99%, 99.9%

rare earth chloride, crystals (45% minimum) and cast lumps (44% minimum) total rare earth oxides

rare earth fluoride, 81-83% total rare earth oxides

samarium oxide, yellowish to white powder, 99%, 99.8-99.9%

scandium oxide, white powder, 99%, 99.5-99.9%

Vitrox C (cerium oxide polishing compound), 90-92% cerium oxide

Vitrox R (rare earth oxide polishing compound), 42-43% cerium oxide

xenotime, 55.4% rare earth oxides yttrium exide, 99%, 99.8-99.9%



after drying, rare earth chemicals undergo further processing

THORIUM PRODUCTS

thorium nitrate, white crystal, mantle/wire grade, 46-47%

thorium oxide, white powder, ceramic grade,

thorium fluoride, white powder, ceramic grade, 99%

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thorium-magnesium master alloy, 20%, 30%, 40% thorium available in notched quarter-round base

didymium-magnesium master alloy



sample ingots of Th-Mg hardner for use in missile alloys are heated for quality check

COBALT CHEMICALS

cobalt acetate, pink crystals, 23.7% Co cobalt carbonate, pink-violet powder, 46.0% Co

cobalt hydrate, pink powder, 61.0% minimum Co

cobalt sulfate, pink crystals, 75% on 20 mesh, 21.0% Co + Ni

cobalt sulfate (monohydrate) pink crystals, 33.0% Co



spectrographic analysis insures aximum quality control



durability is one of several control tests on Vitrox polishing compound

NICKEL CHEMICALS

nickel carbonate, green powder, 46.0% Ni nickel chloride, light green wet crystals, 24.5% Ni + Co

nickel sulfate, blue green crystals, 22.15% Ni + Co

URANIUM CHEMICALS

sodium diuranate, orange powder, 86.0%

uranium concentrate

uranium oxide, black powder, 98.5-99% U₂O₈

ZIRCONIUM CHEMICALS

zirconium acetate (solution), clear to light yellow solution, 14% zirconium oxide

zirconium carbonate (basic), pasty white iell. 28-33% zirconium oxide

zirconium oxychloride, white powder, 36% zirconium oxide

zirconium sulfate, white powder, 32-34% zirconium oxide

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Putting New Pressure on Acetylene

Engineers at C. F. Braun's Alhambra, Calif., offices are pushing ahead with design work on this country's first plant to use the Montecatini acetylene process (flowsheet, opposite page). The unit, Diamond Alkali's Deer Park, Tex., plant (CW Technology Newsletter, Nov. 19), is scheduled to go onstream in '61.

Montecatini first made the process available for licensing in '58, when Nissan Chemical Industries, Ltd., chose it for a plant at Toyama, Japan. Since then, Nissan has started work on a second plant (at Nagaoka), while design on similar units has been started by Kyowa Fermentation Co., Ltd. (Ube, Japan), Dusikarni Cechi (Most, Czechoslovakia), Zjednoczemie Chemicznej (Tarnow, Poland), the U.S.S.R. government (Urals), and Montecatini itself (Brindisi, Italy). And in Nov. '59. Giacomo Fauser of Montecatini described the process in an Italian report, the basis for the flowsheet.

This flurry of activity demonstrates the economic advantages of the process, which converts natural gas into acetylene through partial oxidation. The only such plant currently operating is Montecatini's own unit (5,500 ton/year) at Novara, Italy, where the process has been under pilot and commercial development.

Most of these companies hope to produce an acetylene that is competitive with carbide acetylene-normally the cheapest among acetylenes. These companies are too widely scattered for an economic generalization, but experts say a large U.S. plant (100 million lbs./year) can produce acetylene through the Montecatini route for a total manufacturing cost of 5-6¢/lb., allowing 20¢/million Btu. for natural gas and \$7/ton for the oxygen. Since U.S. carbide acetylene manufacturers are selling their product for about 12¢/lb., the Montecatini process promises healthy markup.

Pressure's Five-Point Advantage: Although much of Montecatini's early work at Novara was devoted to perfecting an improved recovery system, its real process breakthrough came when it tackled the problem of higher heat recovery from the reaction.

This reaction faces three classic problems: (1) It is highly endothermic, so it requires an effective heat source. (2) Its efficiency is favored by high temperatures, so the reaction must take place at flame temperature (about 2700 F). (3) Its acetylene product is unstable at this high temperature, so the cracking flame must be quenched almost instantly.

In addition, pressure was supposed to hinder the formation of acetylene. As a result, some acetylene processes, such as the Wulff process, operate under vacuum. This led Sachse and Bartoleme to develop an atmospheric partial-oxidation burner using natural gas to supply both the heat and the methane for cracking to acetylene. This burner led to the Sachse acetylene process that is currently producing about 300 million lbs./year in the U.S. (CW, March 26, p. 45). Second to carbide acetylene, Sachse-process acetylene has been used most.

At atmospheric pressure, however, nearly all of the specific heat contained in the burner gases is lost. Like Montecatini's, the Sachse burner uses a water quench. When this water is sprayed into the flame at atmospheric pressure, available steam partial pressure is only about 8 psi., corresponding to about 180 F, and too cold for use.

To get around this loss, Montecatini tried operating its burners under pressure. It found that if about 2% steam were injected into the feed gas, the burner could be run at 60 psi., with no loss in cracking efficiency and with good flame stability. Pilot operations at this higher pressure also showed that:

- Up to 20 million Btu. of heat from condensing steam can be recovered for each ton of acetylene produced.
 - · Soot, generated by the partial-

oxidation flame, is much more easily removed from product streams.

- The burner capacity is increased roughly fivefold, so smaller or fewer burners can be used.
 - · Compressor costs are reduced.
- Acetylene polymers, formed as by-products during the cracking reaction, are more easily removed.

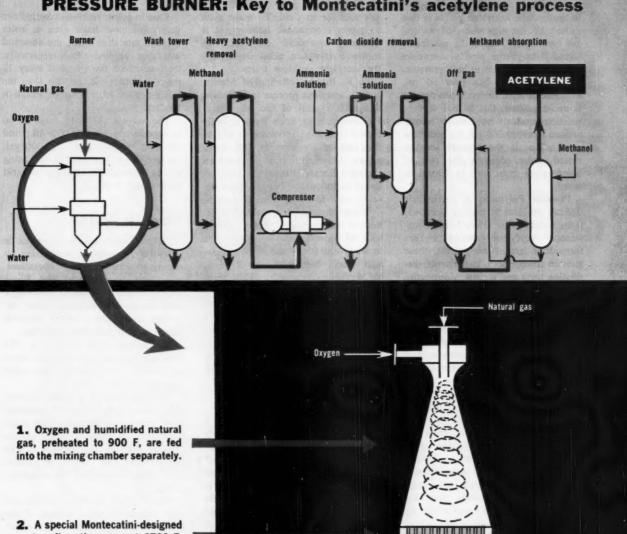
Heat Recovery: Typical acetylene processes eat up about 40 million Btu. of heat for each ton of acetylene produced; most of this goes into the formation of the triple carbonto-carbon bond. Out of this, about 7 million Btu. are required to boil the acetylene product out of methanol in the acetylene purification step, and another 13 million are required to regenerate the ammonia and methanol solutions used in the purification steps. All of this heat (20 million Btu.) can be recovered, if by-product steam is available. Montecatini has found that operating the burners at about 60 psi. allows it to produce by-product steam at about 260 F.

Scrubbable Soot: A major problem of acetylene plants using any cracking process is the fine soot carried out with the reaction products. This soot is especially troublesome because it isn't easily wetted by water (it will float) and is therefore hard to scrub out of the product gases. Yet, when pressures at the burners are increased so that the temperature of the quench water goes above its normal boiling point, the fine soot is easily wetted and scrubbed out of the product gases in the wash tower.

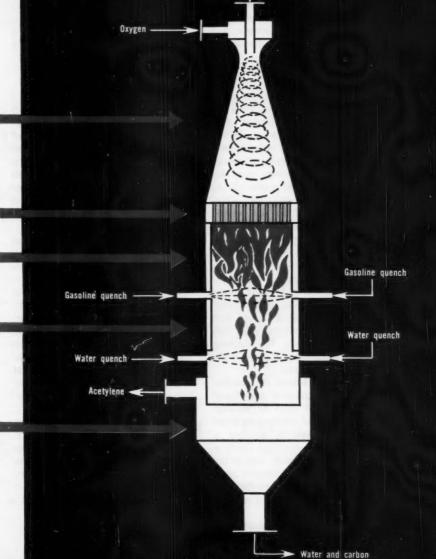
Another problem of partial-oxidation-type acetylene plants has been burner design. Because of the high temperatures, these burners require special materials and insulation and are expensive. Since increasing the pressure to 60 psi. reduces the volume of the reacting gases to about one-fifth, a given burner will have about five times as much throughput capacity—but it is still tricky to design and build.

Compressor Costs: A hidden loss

PRESSURE BURNER: Key to Montecatini's acetylene process



- system fires the gases at 2700 F.
- 3. As part of the natural gas feed is burned to supply heat, the natural gas is cracked to acetylene.
- 4. A first quench of liquid hydrocarbons - e.g., gasoline - cools the gases to about 1800 F; the quenching hydrocarbons simultaneously are cracked.
- 5. After a water quench that brings the product gases to about 260 F, the hot water with contained soot is drawn off in a slurry. Ethylene, acetylene and carbon dioxide are drawn off the side.



in Sachse-type acetylene plants is that caused by decompression of natural gas feed stream. Since the gas transferred through the pipeline networks is carried at medium to high pressure, it almost always has over 60 psi. available at plant limits. When the gas is decompressed, this is lost, for the reaction products have to be recompressed to about 200 psi. for acetylene purification. If the burners are operated under pressure, the cost of compressing from zero to 60 psi. is saved.

Problem Polymers: A particularly difficult problem in making acetylene from hyrocarbons arises because unwanted acetylene polymers are formed. If left in the process, these gum up compressors, instruments, distillation trays and piping. Montecatini has found that operating the burners under pressure helps remove these polymers from the burner effluent before they have a chance to cause trouble. In its Novara plant, methanol is sprayed into the gas streams, and the rich methanol is regenerated in degasifiers.

The Methanol Method: Since acetylene can explode if its partial pressure in a mixture of gases is brought above 20 psi., it is never purified from the reaction products by distillation under pressure. Instead, most processors use selective solvents-e.g., butyo lactone and dimethyl formamide. However, early work at the Novara plant led Montecatini to choose methanol. As shown in the flowsheet (p. 61), acetylene is absorbed from the washed product gases by methanol in a fractionating column operating at 95 F below zero. The acetylene is then driven out and the methanol regenerated by heating it up to 140 F.

Gasoline Quench: A final feature of the Montecatini process is a partial quench in the cracking burner with gasoline or light hydrocarbons. This quench is shown in the drawing (although Diamond Alkali will not use it in its new plant).

The reasoning behind the gasoline quench is that gasoline and liquid hydrocarbons will react to produce both acetylene and ethylene at about 1700 F. Therefore, if gasoline is sprayed into the natural gas cracking flame, part of the specific heat of the gases is used in an endothermic reaction cracking the gasoline to ethylene. This improves heat efficiency without

any sacrifice in yield. To make such a system economical, however, it is necessary to recover ethylene. This means a complete plant duplicating the acetylene recovery train.

C. F. Braun's offering of Montecatini's acetylene process to U.S. conditions is typical of the way many U.S. engineering firms have recently turned to foreign processes to add to their list of services for U.S. companies. Although it does not have an exclusive license, Braun has been allowed to follow the Novara plant developments for more than five years.

When the process reached commercial development, Braun sent a team of process engineers to Novara to study operations and work out design details and know-how (covered by secrecy agreements). This team was then prepared to bid the Montecatini process against other processes when Diamond Alkali solicited bids for its Deer Park plant. Although this is the first U.S. application, the process's international acceptance assures it of being a major force in world acetylene production.

Reservoir Liner

A chemical formulation that cuts down water seepage in reservoirs, irrigation canals and similar bodies of water has been developed and proved commercially successful by Brown Mud Co. (Torrance, Calif.). Results of three years of commercial usage shows that the rate of seepage is cut 50-75% at a cost of less than \$5-acre-ft.*

The antiseepage compound, called SS-13, is an emulsion of organic polymers in a diesel oil carrier. Although its action hasn't been positively determined, the compound is believed to fill the voids in the soil. Another possibility: the chemical adheres to particles of sand or clay at the bottom of a pond, and surface tension prevents the water from seeping through. In any case, it halts water loss that studies by the U.S. Bureau of Reclamation show to be 30-50% of the reservoir's content.

To line a pond, SS-13 is added to the water—1 gal./1,000 gal. of water. In quantity, a gallon of SS-13 costs about 80¢. However, it remains to be determined how often a pond must be relined.

Case in point: reservoirs treated two years ago now have even a lower seepage rate than when the chemical was first applied. And, reportedly, treatment with the chemical every 12 months would still cost less than the interest paid on a loan to install a concrete lining.

The volume of SS-13 used in '60 is expected to be 150,000 gal.; and for next year, sales of 500,000 gal. are projected. Distributors are being set up throughout virtually all arid parts of the world.

Smooth Shape

Its new electroshaping process is potentially capable of duplicating all common metal-shaping operations, says Steel Improvement and Forge Co. (Cleveland). Claimed advantages over standard techniques: lower operating cost; faster metal removal rates; no tool wear-out problems.

The process (CW, Nov. 5, p. 70) suits conventional semiautomatic feeding devices and operators can easily be trained.

The operations that electroshaping can replace are essentially finishing steps. But no preliminary rough work is needed; a smooth surface is always present because the process works by brushing off layers of atoms rather than by gouging out molecular slices.

Here's what happens: electrodes with contours identical to those of the final product are positioned on either side of the workpiece. These electrodes serve as cathodes, while the piece is made to function as the anode. The three parts of the system are then immersed in a solution, which carries direct-current electricity. This current "works" the anode, gradually achieving the desired shape, as the cathodes are moved closer together.

This cathode movement is the essential difference between the new process and electropolishing, a process in use for many years. Electroshaping is essentially a directed form of electropolishing, for the latter process uses stationary electrodes.

The Bath: The solution used in the electroshaping bath is composed largely of common inorganic chemicals, although their identity is proprietary information. However, the bath formulation—acids, alkalis and some organics may be added—varies, depend-

^{*} One acre of area 1 ft. deep.

THE QUALITY OF

HINKING

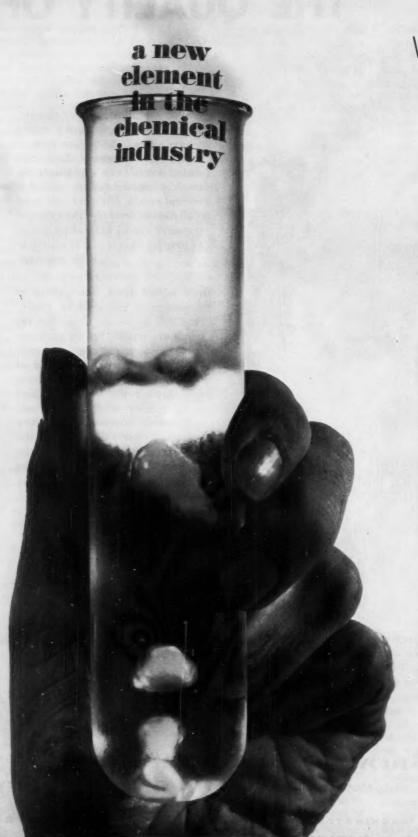
From an almost unlimited scope of thought, Leonardo da Vinci brought forth a stream of inventions which - in modern form are in use today. However, Leonardo's greatest contribution was simply the triumph of creative thought applied to practical results. His work will stand for all time as proof that the appraisal of quality applies to thinking as well as to tangible objects and to visible or audible processes.

> In a related sense, the quality of engineering is measured by results. And it is by results alone that the minds responsible for an engineering project can be evaluated. When you check the record of Brown & Root's engineering through the years, the high quality of thinking is selfevident. Customer satisfaction from greater efficiency at lower costs has built a worldwide reputation for engineering and construction by Brown & Root.

This squirrel-cage blower, invented by Leonardo da Vinci and put to practical use, was a significant step toward modern mechanical air conditioning.



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Witco Chemical Company, Inc. welcomes Sonneborn Chemical and Refining Corporation

into its family of subsidiary and associated companies



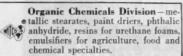


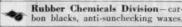
Witco Chemical Company, diversified producer of a broad line of chemical products for industrial and specialty uses, now supplements its services with the manufacturing, research and technical facilities of a new wholly owned subsidiary, Sonneborn Chemical and Refining Corporation.

For approximately forty years, Witco has achieved steady expansion and recognition as a supplier of organic chemicals, detergents, carbon blacks, waxes, bituminous products and other materials to nearly every branch of industry throughout the world. Now, with the new affiliation, our customers will be able to select from an even wider range of related products in Sonneborn's white oils, petrolatums, petroleum sulfonates, microcrystalline waxes, lubricating oils and greases, solvents, and other petroleum specialties, in addition to textile chemicals and building-product specialties.

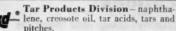
We take pleasure in welcoming our new partner in a growing enterprise.

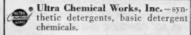
THE WITCO GROUP

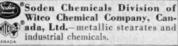


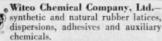


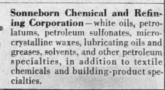














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ENGINEERING

ing on the metal that is to be cut. Difficult-to-machine metals such as tungsten and molybdenum and extremely hard materials such as cemented carbides can be electroshaped. Manufacturers of these space-age metals may get to license the shaping process. But the process developers have not yet decided whether they will license it.

Iron from Nickel

Work is under way at Copper Cliff, Ont., on a plant in which International Nickel Co. of Canada, Ltd., will use a new process for recovering iron. The iron will be in the form of ore pellets extracted from an ironnickel ore concentrate called nickeliferous pyrrhotite.

International Nickel prepares the pyrrhotite during ore treatment prior to smelting for the recovery of nickel. The ratio of iron to nickel in the pyrrhotite is high, 10 to 1, which sparked research aimed at a method of concentration.

The Copper Cliff process involves five steps:

(1) Sulfur is removed from the ore in fluid-bed roasters operating in a closed circuit for good heat recovery.

(2) The calcined ore concentrated from the roasters is selectively reduced in rotating kilns using carbon monoxide flowing countercurrent to the

(3) Nickel is extracted from the reduced kiln product by countercurrent leaching with ammoniacal solutions under atmospheric pressure. During this leaching operation, permanent magnet drum separators are used for

(4) Nickel is precipitated from the pregnant leaching solution in steam kettles.

(5) The thickened magnetite fines are agglomerated into 1-in.-diameter balls by pelletizing them on discs and firing them in a traveling grate kiln. These pellets contain about 68% iron.

International Nickel expects this process to triple its iron ore recovery capacity. It will treat 1.2 million short tons/year of nickeliferous pyrrhotite for an output of 900,000 tons of pelletized iron concentrate. The plant, which is expected to be in full operation by '63, will cost a total of \$50 million, of which \$10 million will be spent in '61.



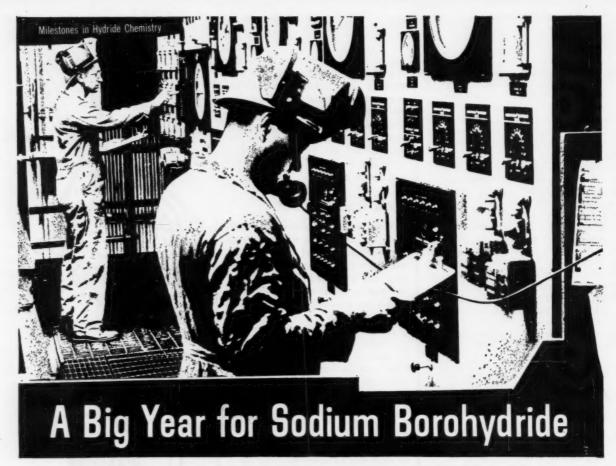
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New applications — New product forms have sparked many new applications. Pellets, for example, make sodium borohydride ideal for continuous

fixed-bed, in-stream carbonyl group and peroxide reductions. SWS will perform the same reductions using simple contact methods. Sodium borohydride is exceptionally effective for foaming plastics and silicates; bleaching and stabilizing wood pulps; and treating natural and synthetic textiles. In any form, it offers many advantages as a high-yield reducing agent for esters, aldehydes, ketones, and peroxides.

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Company President Thayer details how Mallinckrodt will reorganize.

Reaching for New Markets

Mallinckrodt Chemical Works, a comparatively small Midwest producer of a big and varied list of chemicals, is gearing up to reach new markets, to respond more quickly to customer needs. Last week Mallinckrodt's new President Harold Thayer told Chemical Week just what the firm's divisional reorganization is intended to do.

"Now," says Thayer, "we'll reorganize our former functional groups into three divisions—medicinal, industrial, and nuclear—each of which will have its own research, development and marketing departments." These changes are based on a two-year internal survey started by President Joseph Fistere, who has since retired (CW, Nov. 26, p. 76), that found the 93-year-old company to be inadequately oriented to the markets it has grown into over the years.

The change won't affect the company's operating division, which handles most chemical production at the North St. Louis, Mo., complex, and at a plant in Jersey City, N.J., nor other service departments such as legal, accounting and purchasing, chemical control, packaging and warehousing.

Autonomy Aim: Each of the new divisions will be headed by a vicepresident and general manager. Largest of these, the Medicinal Division, which this year will ring up about one-half of the company's estimated sales of \$36.5 million, is headed by John Gaston. The Industrial Division, which will turn in about one-third of Mallinckrodt's sales dollars, is led by Vice-President Frederick Belmore, former general manager of the company's commercial nuclear activities.

The new Nuclear Division, well known among Mallinckrodt's activities because of its place in U.S. atomic development, currently embraces both the company's government nuclear operations and its own private nuclear operations. It's headed by newly appointed Vice-President Charles Harrington. Along with export sales and other miscellaneous business, it contributes 15-20% of Mallinckrodt's yearly sales. In terms of personnel, however, it represents about one-third of the company.

Mallinckrodt is an old hand at the nuclear business. The company purified the uranium used in the first self-sustaining nuclear reactor in '42 and has since operated increasingly large AEC uranium facilities. The company's '60 fee: \$580,000. In '56 Mallinckrodt was the first to enter the private nuclear fuel field and still is a

major factor in the business. The company has its private nuclear fuels plant at Hematite, Mo., and operates the AEC feed-materials plant at Weldon Spring, Mo.

Zero In: The new setup, according to Thayer, will permit Mallinckrodt to much more effectively zero in on specific markets. "Until now," he points out, "we've had one research group that worked on all products and all end-use development, and one sales group that sold all products to a large number of end-users. This makes it hard to recognize and identify opportunities because it doesn't result in depth of knowledge by sales or technical people about any particular markets."

The industrial division is an example. Now that it can better concentrate its efforts, it will try to broaden its markets via distributor sales.

But distributors may run into the same misconception that Mallinckrodt does: "Unfortunately," Thayer says, "there's a sizable public impression that most of Mallinckrodt's production goes into small bottles that wind up on laboratory shelves."

Actually, the analytical reagents are but a small part of over-all industrial sales. The company produces a long line of turf fungicides, as well as inorganic and other industrial chemicals that go into the electronics industry, toilet goods field, and coatings industry. The company's output is so diversified, Thayer says, that no product or class of products "accounts for more than 15% of Mallinckrodt's total sales."

What are Mallinckrodt's plans for development? Determining these is "the very purpose of the reorganization," Thayer says. "By setting up an improved system for evaluating products and getting bigger markets, we'll be able to do a much better job of deciding where to go next. One of our major jobs—as soon as we have enough information—is to improve our long-range planning."

Likely Targets: Observers of Mallinckrodt's activities over the past several years see a number of likely prospects. A major part of medicinal sales dollars comes from pharmaceutical manufacturers; they use Mallinckrodt chemicals as raw materials to make pharmaceutical specialties

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NEVILLE 2-50-W HI-FLASH* SOLVENT—CLEAR. In this completely unretouched photograph, Tyndall effect is shown on an alkyd solution reduced by Neville 2-50-W Hi-Flash Solvent. Notice there is little light trace from the parallel beam of the collimator lamp, indicating a high degree of solvency.



"AROMATIC X"—CLOUDY. In this photograph (also unretouched) the same beam from the same lamp was used, but another "aromatic" solvent replaced Neville 2-50-W Hi-Flash in the alkyd solution. The strong light diffusion shown by the larger undissolved Micelle particles indicates a lesser degree of solvency.

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ADMINISTRATION

and proprietary products. In addition, the company has been a leader in producing narcotics, ether, X-ray contrast media, barium sulfate for X-ray diagnosis, and other medicinal and pharmaceutical specialties. Chances are that Mallinckrodt not only will maintain or increase its specialties in the diagnostic line but also will take on other specialties if opportunities arise.

Another area of probable action is the widening of industrial markets for the company's high-purity chemicals. Most prominent of these markets is the electronics field. While declining to particularize, Thayer believes that much greater opportunity exists for volume sales in specific end-use markets.

And it's quite possible that the company's foreign activity may be stepped up. Thayer told CW that "we had a man in Europe all last summer scouting possibilities for either technical exchange agreements or outright production opportunities."

The company has already ventured in this direction, owns a minor interest in two newly formed nuclear companies in Europe. One, in Germany, has Degussa as its majority owner, the other, in Italy, has Montecatini and Fiat as important shareholders. To these alliances Mallinckrodt supplies know-how, licensing and some uranium compounds. While nuclear business hasn't been as good as producers would like, Mallinckrodt nevertheless considers it a field with a good future.

Activity Now: Right now, Thayer reveals, the company is looking at several potential acquisitions that would accomplish some of the growth objectives. None is near final negotiations, but Mallinckrodt is in excellent position, has half a million shares of unissued stock and a strong cash position that could be used for such a transaction.

The new marketing reorganization should put the company in a better position to capitalize on such opportunities by providing sound systems for their study and evaluation.

At this point Mallinckrodt is not making any predictions. Its most immediate objective is to consolidate the activities affected by the current reorganization. Later, look for the company to move in fresh directions, including more pharmaceuticals, wider industrial applications, and foreign development.

MCA Poll on Dues

A question-and-answer session last week following a Manufacturing Chemists' Assn. panel on professionalism among chemists and chemical engineers turned up some information on a related question: Should a company pay meeting fees and dues for employees belonging to professional societies?

Poll of the 250 or so listeners indicated that slightly less than half of their employers would pay expenses to attend local chapter meetings of professional societies. Of the remainder, only a handful indicated that their companies had any policy whatever on the matter.

In another poll, a large majority indicated that their companies would not pay employees' dues for membership in professional organizations. Reason, according to some, is that membership in such organizations is part of individual personal development.

New Action in Jersey

New Jersey chemical and drug companies are accelerating activities designed to portray the industry and its contributions to the state.

This week six drug companies are carrying out plans to take New Jersey Governor Robert Meyner and members of the state legislature on a tour of a pharmaceutical plant. Ciba, Hoffmann-La Roche, Johnson & Johnson, Merck and Schering, represented by top executives of each, will escort Meyner through Squibb's New Brunswick plant, answer questions about the pharmaceutical business, and participate in the dedication of Squibb's new \$2-million packaging building.

And last week, members of the steering committee of the Chemical Industry Council of New Jersey met in Princeton in its first formal meeting to map long-range plans for group action.

The Jersey council was organized earlier this year and includes representatives from Du Pont, Allied Chemical, American Cyanamid (whose Executive Vice-President Kenneth Klipstein is chairman of the council), Union Carbide, Hercules Powder, Hoffmann-LaRoche, Merck, Food Machinery & Chemical, and Celanese.

Among other things, the council will sponsor the second annual Chemical

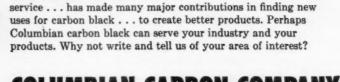
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ADMINISTRATION

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LABOR

Cyanamid Pact: An 85-day strike against American Cyanamid's Fortier, La., plant by 470 members of Oil, Chemical & Atomic Workers Union Local 4-603 has ended with settlement on a company offer of an average 4% hourly wage increase. The new 22-month contract, effective Nov. 21, hikes the plant's top pay to \$3.22/hour, the starting rate to \$2.18, includes provision for a wage reopening in Oct. '61. A major issue was the company's right to make temporary transfers without relying solely on seniority. The company retained the right.

V-C Runoff: Some 700 employees of Virginia-Carolina Chemical Co.'s Bartow, Fla., phosphate plant are voting this week on whether they'll be represented by the Teamsters Union or no union at all. The runoff was scheduled by the National Labor Relations Board after a vote Aug. 26 failed to produce a majority of votes for either no union, Teamsters or International Chemical Workers, although the Teamsters did edge out ICWU. The Teamsters Union has tried for several years to break into the ICWU-monopolized phosphate fields.

Troubled Oil: Against the backdrop of OCAW demands for an 18¢/hour across-the-board wage increase in its oil industry bargaining, and the industry's general resistance to any increase on the grounds that refinery operations are in bad straits, an offer of a 5% wage increase—amounting to over 14½¢/hour—by American Oil Co.'s Texas City refinery has raised eyebrows in the area. A similar offer by Standard Oil of Indiana had been rejected by the union.

The Amoco plant has effected a 5% increase for its salaried employees and others not under OCAW jurisdiction. It has told the union the same increase would be immediately effective if employees would agree to a two-year contract with no wage reopener provision for the two-year period. While management will say

only that it feels the offer is a good one, local observers think the company would like to preclude any strike problems such as it has had in the past year. The company is now building its highly automated distilling, cat-cracking and alkylation units, due onstream in late '61 or early '62.

Other oil industry management, hoping to conclude this year's series of negotiations with minimum, if any, raises, are disturbed by the approach Amoco is taking.

KEY CHANGES

Ralph Falk II to chairman of the board, Mrs. Marian C. Falk to board of directors, Baxter Laboratories, Inc. (Morton Grove, Ill.).

Walter N. Plaut to president, chief executive officer, Lehn & Fink Products Corp. (New York).

Arthur V. Danner to president, Mobil Petroleum, Dallas R. Lamont to senior vice-president, research and engineering, parent company, Socony Mobil Oil Co., Inc. (New York).

Richard L. Gelb to board of directors, Bristol-Myers Co. (New York).

Hubert M. Aronson to vice-president, Alsynite Division, Reichhold Chemicals, Inc. (White Plains, N.Y.).

Michael J. Gluck to vice-president, general manager, Heyden Newport International Division, Heyden Newport Chemical Corp. (New York).

Earle S. Ebers to group vice-president, polymer, fiber and chemical operations, United States Rubber Co. (New York).

Jerry McAfee to vice-president, executive technical advisor, Gulf Oil Corp. (Pittsburgh, Pa.).

Arthur Sherwood to executive vicepresident, Schwarz BioResearch, Inc. (Mt. Vernon, N.Y.).

Charles W. Deane to vice-president, Processes Research, Inc. (New York).

Neil B. Conley, Philip G. Connell, Jr., Thomas P. Turchan to division general managers, Organic Chemicals Division, Pigments Division and Industrial Chemicals Division, respectively, American Cyanamid Co. (New York).



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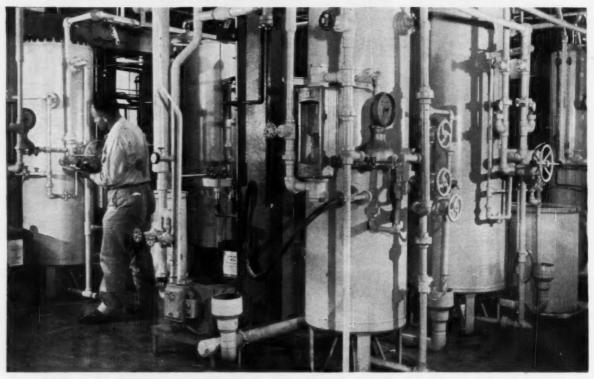
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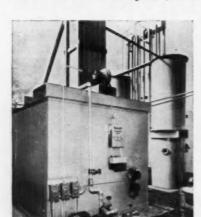
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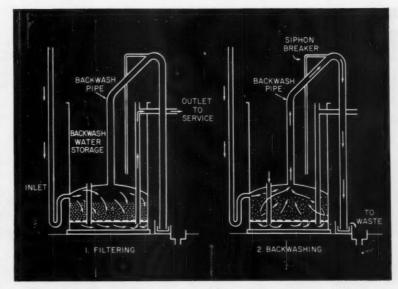


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The diagram here shows you how the valveless filter works. During filtering, loss of head causes water to gradually rise in backwash pipe. When it reaches 4-5 ft. above the backwash storage level, it starts a siphon action. This lowers pressure above the sand bed, reversing the water flow, and backwashing begins. Backwash continues until the level in the backwash water storage tank falls below the end of the siphon breaker. Then the siphon is broken, and the filter automatically rinses and returns to its filtering cycle.

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Bulletin 4351 gives all details.

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tise Carbopol 934 to provide thickening and stabilizing. Both are made by Custom Crest Car Products, Inc., Syracuse, Indiana. B.F. Goodrich Chemical Company supplies the Carbopol 934.

Carbopol 934 thickens and stabilizes without changing chemical action

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Market Newsletter

CHEMICAL WEEK
December 3, 1960

Polystyrene tabs will move lower as a result of last week's reductions by Foster Grant Co., Inc. (Leominster, Mass.). Involved are general-purpose polystyrene molding and extrusion resins, prices of which will be cut $2\frac{1}{2} \frac{e}{l}$ b. New tabs: $19\frac{e}{l}$ b. in volume (20,000 lbs. and over). Reports from other polystyrene producers indicate that the new lower quotes will become industry-wide.

Further savings of 1 e/1b. to customers are possible under a special customer performance award plan. To obtain the lower price, which applies to general-purpose and impact polystyrene, customers must meet these requirements: (1) submit a written estimate of requirements for a 90-day period on a CPA form; (2) orders must be placed at least 15 days prior to requested shipping date; (3) items ordered must be included in the company's published price lists and packaged to the firm's normal specifications; (4) deliveries must be made from Leominster, Mass.; in not less than minimum truckload quantities to single destination; no warehousing; (5) each shipment must contain a minimum truckload quantity of a single item; (6) payment: net 30 days.

Customers who meet those requirements are entitled to a reimbursement award after the 90-day period. Since other producers report they will meet competition, it's likely that a similar plan will be adopted by them.

Where will phthalic anhydride prices stabilize in '61? Currently, the industry is faced with three price schedules as a result of Allied's move last week to lift quotes 1 e/lb. on carload lots. Its new price: 20 e/lb., c.l. lots (19½/lb. in tanks). Spot prices go into effect immediately, with contract tabs going up Jan. 1.

Meanwhile, Reichhold holds its phthalic price at 21 e/lb. in c.l. lots. The third price—19 e/lb. in c.l. lots—is still being quoted by others.

Big question now: Will other producers move their quotes? Reports from the field indicate that there's no rush to follow Allied's move. One of the big factors causing uncommitted producers to move slowly is the possibility of more-than-ample supplies of phthalic anhydride due in '61 as more naphthalene raw material becomes available from both coal-tar and petroleum sources (CW Market Newsletter, Aug. 6).

Add another 6¢/lb. to the price of pyridine. The new quote which goes into effect Jan. 1, '61, for contract prices (Nov. 15 for spot) was initiated by Reilly Tar & Chemical Corp. New tabs, f.o.b. Indianapolis (freight equalized): tank car, 71¢/lb.; truckload, 75½¢/lb.; l.c.l., 76¢/lb.

A new, 14-million lbs./year polyvinylidene chloride plant was placed onstream at Meredosia, Ill., last week by National Starch and

Market

Newsletter

(Continued)

Chemical Corp. National thus becomes the second U.S. producer of this fast-growing plastic material (the other is Dow).

The resin will be sold as Resyn 3600, an aqueous dispersion of vinylidene chloride copolymer, for use in coatings. The new unit is the latest addition to National Starch and Chemical's multiple-plant operation at Meredosia, which includes one of the world's largest polyvinyl acetate emulsion facilities.

The market for Delrin climbs as the plastic continues to find new uses. Most recent is Delrin's introduction this week as an aerosol container—another first for the Du Pont acetal resin—when Avon Products (New York) adopted a Delrin container for aerosol colognes. Strength, impact resistance and ability to hold propellant and components of the cologne, along with styling advantages, are said to be primarily responsible for the plastic's success in this use.

A molybdenum ore strike that promises to be one of the biggest in the world has been uncovered near Questa, N. M. As a result of exploration partly financed by the Interior Dept.'s Defense Minerals Exploration Administration, Molybdenum Corp. of America (New York) has uncovered an estimated 260 million tons of ore containing about 3% molybdenum disulfide—equivalent to 760 million lbs. of molybdenum. Continued exploration is uncovering zones of higher concentration that may extend this find.

Currently, molybdenum is on the critical-materials list. U.S. consumption was 60 million lbs. in '59 and is expected to climb to about 90 million lbs. by '75. It currently sells at \$1.25/lb.

England's polyethylene tabs are moving lower. Imperial Chemical Industries has slashed PE tabs about $4.7 \epsilon/lb$, bringing prices down to about $25.7 \epsilon/lb$. Reason for the move, according to ICI, is to stimulate PE sales. But the prime reason may be the growing world surplus of polyethylene capacity, as well as England's increasing export difficulties combined with its competitively priced imports.

Output of man-made fibers in England hit another record in October, a trend that has persisted each month this year. Total October output was 50.21 million lbs., compared with 47.15 million lbs. in Oct. '59. Total production in the first 10 months of '60 amounts to 493.89 million lbs. vs. 415.90 million lbs. during the same period in '59.

SELECTED PRICE CHANGES-WEEK ENDING NOV. 28, 1960

	Change	New Price
Cedarwood oil, cns. Citronella, Java type, dms.		\$0.80 1.00
Castor oil, No. 1 Brazil, tanks Soybean oil, crude, tanks		\$0.1825 0.1025

All prices per pound unless quantity is quoted.

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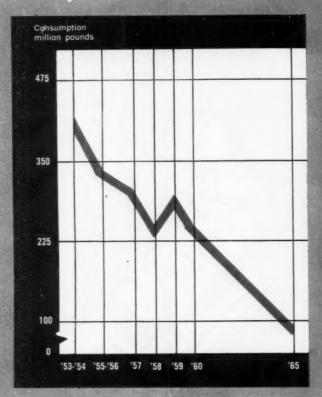
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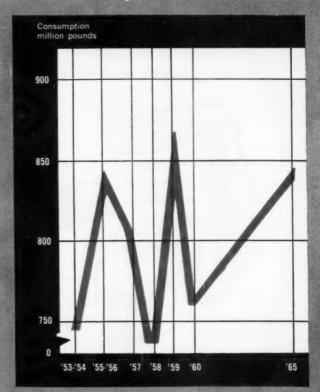


Stauffer

Rayon tire-cord demand sinks



... But other rayon and acetate use rises



New Uses Bolster Rayon's Outlook but Won't

The rayon and acetate markets picture today is not a bright one. A lack of over-all growth (charts above) plus a consistent drop in prices have combined to devastate the earnings of some rayon producers.* And although new rayon products are coming to market, the outlook is for a continued downtrend in rayon consumption.

Underscoring rayon's dim future are recent moves by two rayon producers to shore up their sagging profit structures:

• American Enka, one of the largest producers of rayon tire cord, last week continued its diversification by expanding nylon-6 capacity 70% at its Enka, N. C., plant (CW Business Newsletter, Nov. 26).

· "As part of a program . . . to

eliminate losses," Industrial Rayon last week sold its nylon plant at Covington, Va., to Hercules Powder. IR also disclosed it will consolidate all rayon textile operations at its Painesville, O., plant.

Tied to Tire Cord: Major reason for rayon's dismal situation is, of course, nylon's continuing gain in the tire-cord business. Each year, nylon tire yarn has carved a larger share of the total market. Since '53 nylon's share has grown from 18 million lbs. to 147 million lbs.

Over the same period, rayon use has slumped from 480 million lbs. to 248 million lbs.

During the next five years, annual consumption of rayon tire yarn is expected to decrease to not more than 100 million lbs.

Rayon has tried to fight back. The five rayon tire-yarn producers—Industrial Rayon, American Enka, Courtaulds (Canada), Beaunit and American Viscose—decided on a unified front, organized Tyrex Inc. to

aid them in their market battle.

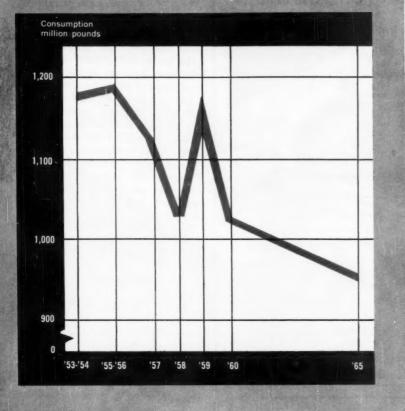
Tyrex Inc. has established quality standards for rayon tire yarn, which has been promoted as Tyrex. In addition, Tyrex Inc., sponsored to the extent of \$3 million/year, is carrying on an extensive advertising program. This program is designed to reach the consumer tire dealer as well as the new-car manufacturers. The effort, so far, although considered successful by some, has merely helped to slow the trend toward the use of nylon.

Besides gaining in the auto tire field, nylon yarn is also winning out in the truck and bus tire market. Tyrex Inc. has prepared considerable experimental data pointing out the superiority of its sponsors' products in this end-use. Despite this, rayon yarn has been losing ground consistently. (Nylon yarn producers have also prepared effective experimental data to counteract Tyrex's claim.)

The only segment of the cord market in which rayon has maintained

^{*}Nonconsolidated earnings of American Viscose in the first nine months of '60 were reported to be 90\$\epsilon's\hatara (some in the same period of '59. American Enka registered a profit of 35\$\epsilon's\hatara (some in the same period of '59. American Enka registered a profit of 35\$\epsilon's\hatara (some in the same period of '59. American Enka registered a profit of \$40\$\epsilon's\hatara (some in the same period of '59. and Industrial Rayon lost \$1.40\$\epsilon's\hatara so far this year, compared with a profit of \$47\$\epsilon's\hatara during nine months of '59.

... Yet over-all consumption declines



Offset Tire-Cord Loss

its dominant position, says Tyrex, is in passenger car original-equipment tires—because of superior properties such as the lack of flat spotting. A more realistic reason why rayon has not been pushed out of this market: it's cheaper than nylon.

But nylon is gaining ground in this use. The '61 Chrysler Imperials are offering nylon cord tires as optional equipment on new cars. By '62 this practice is expected to continue, the '63-model year will doubtless mark the start of a significant rise of nylon tire-yarn use in original-equipment tires at the expense of rayon.

Another important factor, not generally mentioned—but one that exerts a considerable influence on nylon cord sales—is the dealer's profit.

A close examination of dealers' markups on tires reveals that he makes considerably more profit from the sale of nylon-corded tires than from similar-quality tires made from rayon. In his daily selling, therefore, he has exerted much more effort toward the

sale of nylon-corded tires. This influence is significant.

Meanwhile, the profit margins for rayon are at an all-time low. The competitive battle between nylon and rayon has brought about drastic price reductions of the fibers. This is especially true for tire cord. Two price reductions of 840-denier nylon brought its price down to $97 \phi/lb$. in August of this year. Rayon producers then cut their prices to remain competitive. But last month the price of Tyrex rayon yarn was increased. This move will make nylon yarn more competitive.

All things considered, it's obvious that rayon is fighting a losing battle to maintain a sizable share of the tire market.

Other Outlets: Textile outlets for rayon and acetate are too numerous to identify individually. While this broad segment of the market has not seen any growth for the past five years, except in '59, which was an exceptional marketing year for all tex-

tiles, a slight improvement in this condition is expected in the years ahead. By '65, an increase of approximately 80 million lbs. of these fibers is expected to be gained—from today's 770 million lbs./year to 850 million lbs./year.

New and improved staple rayons will be responsible for this growth. As in the case of tire yarn, the rayon and acetate textile yarn producers have been undergoing an aggressive product improvement program in their bid for greater utilization of rayon and acetate in textile applications. The lack of growth of rayon and acetate fiber during the past several years has been due to the inherent limitations of regular rayon fiber as well as the introduction of new and superior synthetic fibers.

Dacron's growth is the major reason for the demise of rayon and acetate in men's and boy's wear. Blends of Dacron and wool and of cotton and rayon have made significant and substantial inroads into this market. The end-products display good body, durability, crease resistance and desirable hand—all properties that have been warmly welcomed by the U.S. consumers.

Rayon and acetate has also been losing out in women's, misses' and juniors' wear. Other fibers, especially cottons, have been able to consistently capture a larger share of the total each year.

The only major textile use in which the cellulosics have been able to realize continued market acceptance and growth has been in home furnishings and miscellaneous textile applications. However, even here, synthetic and natural fibers have been making substantial gains at the expense of rayon in some of the major home-furnishing applications such as rugs and tufted face yarns.

Now Improved Rayon Fibers: The new rayon fibers being introduced and promoted are in two broad categories: high modulus and cross-linked.

Only two cross-linked cellulosic fibers are now commercially available, Corval and Topel. They are both produced by Courtaulds. Although the Federal Trade Commission classifies these products as rayon, their structure, according to Courtaulds, makes them chemically and



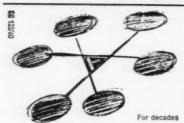


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physically different from the other cellulosic fibers. For example, their water absorption and swelling properties are similar to those of cotton, and these fibers are found to have good inherent dimensional stability.

Corval is soft, bulky and wool-like and gives promising results when blended with wool as well as synthetics such as Orlon and the acrylics. Corval resists fuzzing and pilling.

Topel is expected to find its market in blends with cotton, acetate and nylon. The end-products have a soft hand and good appearance, along with good dyeing properties.

Five so-called high-modulus rayon staples are commercially available: Zantrel (Hartford Fibers Co.), Avril (American Viscose), Fibers 500 and 700 (American Enka), and Moynell (Courtaulds).

The first U.S. plant for the production of Zantrel was put onstream this month. Hartford's Dave Reich, says Zantrel-like the cross-linked rayons -are quite different from conventional rayons, both structurally and chemically. These high-modulus cellulosics have high wet strength, low breaking elongation and high elastic recovery. They also display low water absorption properties and good dimensional stability as well as ability to withstand caustic solutions.

The high-modulus cellulosics obviously are decided improvements over regular rayons. Their producers are actively promoting their use in wash-and-wear fabrics, men's and women's wear and for shirtings.

Because rayon reportedly has a questionable reputation in the consumers' minds, the producers of both the cross-linked and high-modulus rayons applied to the Federal Trade Commission for permission to use generic names other than rayon for their new fibers: "linkron" for the cross-linked rayons and "polynosic" fiber for the high-modulus types. Their application was rejected.

Looking Ahead: It's expected that both the cross-linked and high-modulus rayons will help put the cellulosics back on a growth curve. However, these fibers alone will not cure all the ills of this industry, since the expected consumption drop of rayon tire cord will exceed the growth of textile rayon. Considering all factors, the long-range outlook for the rayon industry is bleak, indeed.

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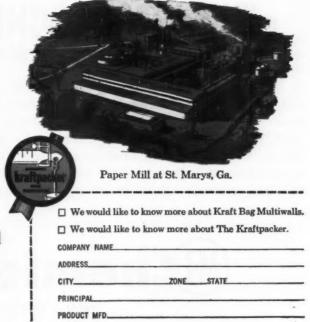
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University of Illinois researcher William Starnes demonstrates tedious hand soybean pollination.

Seeking Chemicals to Improve the Breed

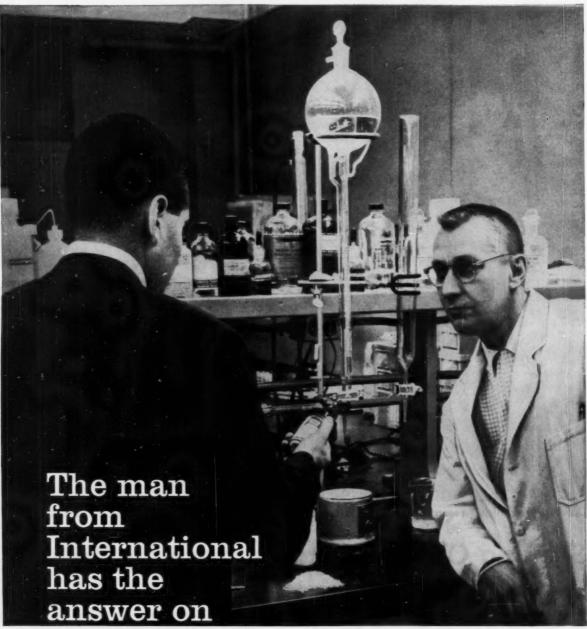
This week Rohm & Haas revealed plans to launch the first commercial gametocide in '61. Its product, Mendok, will be used by a limited number of cotton growers next year to make hybrid seed, may prove whether there is a worthwhile market opportunity for these still-rare chemicals.

Gametocides chemically control pollinization by selectively killing the plant sex cells (gametes) and thereby causing sterility. In most cases, only the male gametes move about, carried by wind, bees, birds, etc. Usually, to make a hybrid seed, the killed-off male cell is replaced by one of a different species. Gamete removal can be done by hand-e.g., detasseling corn-but chemicals may be able to do the job cheaper. And it is this job that Mendok (chemically based on sodium alpha, beta-dichloroisobutyrate—and formerly called FW-450) has been doing in field tests on cotton for the past three seasons.

For Hardy Hybrids: Rohm & Haas is convinced of the need for products that simplify hybridizing because of the proved values of the man-made crop strains. Commercial hybrids feature greater resistance to blight, give better yields than their natural prototypes. Such improved strains of corn and sorghum are already widely used; commercial hybrids of soybeans, alfalfa and cotton are in the offing.

But making such hybrids by hand is an expensive process. Preparing a bushel of hybrid soybeans manually (above) might cost \$18,000 by one estimate. Chemical methods promise to be much cheaper. So, while the market for Mendok-or in fact any successful gametocide—is hard to predict, cost advantage is a powerful argument for optimism.

One variable that precludes market guesses is the gametocide dosage requirement. In discussing Mendok's use for producing hybrid cotton seed, Rohm & Haas explains, "The exact dosage recommended varies with the crop and even with the particular variety within the crop family. The general range of recommendation is a concentration of 0.15 to 0.4% in a solution to be applied at the rate of 11/4-3 lbs./acre. The first application should be made from five to 14 days before initial bloom, with subsequent treatments (total of two to four sprays) at seven- to 21-day intervals. Since



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the dosage recommendations vary widely, it is stressed that each proposed use must be investigated thoroughly before large-scale application is made."

The firm says that Mendok has also been found useful in the production of hybrid seed on tomatoes and also shows promise on sugar beets and cucurbits. However, it warns that all the applications suggested have to do with the production of hybrid seed only. The product is not currently being suggested for direct use on food crops.

Sparse Success: Research on gametocides has been sprinkled among a relatively few chemical companies and universities, and with somewhat sparse success. United States Rubber Co. recently completed a two-year test on corn, using maleic hydrazide as a gametocide. While the compound was about 95% efficient in controlling pollinization, some additional work had to be done by hand.

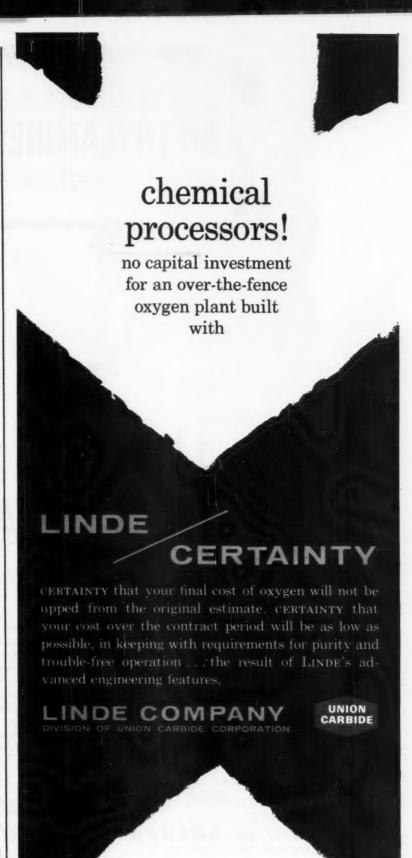
Douglas Tate, manager of the company's agricultural chemical research and development, believes 100% control by the chemical will be required to insure its commercial acceptance as a gametocide for corn.

Some companies strong in agricultural chemical research have done no work on gametocides (e.g., American Cyanamid, Monsanto). Others report only a very limited interest. Dow, for example, observes that its Dalapon (2,2-dichloropropionic acid) has some slight gametocidal activity, but Dow disclaims having much interest in this type of research.

Academic Projects: One center for gametocide research is the University of Illinois. Some research is also under way at the University of California and Purdue. William Starnes, University of Illinois agronomy research assistant, has been investigating male sterilants for soybeans for about two years.

Soybeans are self-fertilized (genetically speaking). It is a long tedious project to pick them apart and transfer pollen by hand—it might take upwards of 15 years to obtain commercial seed by this method. If the male gamete is sterilized chemically, this period can be reduced to two years.

Starnes says he has been working mainly with Mendok in concentrations of about 750 parts per million. He has had a "little" success, mitigated by





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undesirable effects (e.g., distortions) on the plants.

Now Starnes is mapping work at 500 parts per million, hoping this will cause the desired male sterility without the distortions.

Any gametocide effective on soybeans would be assured of a continuing market—the chemical would have to be used to make new seed each year. There is also an opportunity for new gametocides on such crops as wheat, oats, alfalfa and barley, some researchers feel. This could add up to a comfortable market for suitable chemicals that prove not only highly efficient but also safe.

Foreign Patent Pitfalls

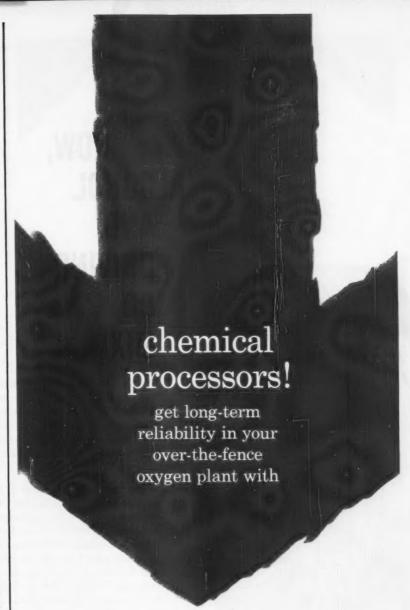
The Manufacturing Chemists' Assn.'s first panel on foreign patents, meeting in New York last week, produced both warnings and advice.

Not everything patented in the U.S. would be profitably patented overseas, foreign patents are not cheap, and the cost has a way of snowballing, says D. C. Harrison, general patent counsel for Union Carbide Corp. His suggestion: a system of screening inventions that would cut foreign patent costs to 25% (or less) of the costs of processing a patent without screening, and at the same time would not pass up important foreign patent possibilities.

Harrison's screening operation involves answering these questions: Will the invention be of enduring importance? Where, overseas, will it be of importance? What are your chances of making profitable use of a patent in a selected country? In theory, three men—a domestic technical expert, a foreign business expert and an attorney—ought to be enough to handle the screening, Harrison says.

Trimming the List: Du Pont's R. W. Ball, senior attorney, foreign patents, observes that "an average large American chemical company has 12,000-15,000 pending foreign patent applications and foreign patents in force. Annual maintenance fees run into six figures, and the total annual cost of its foreign patent program can easily run into seven figures." His advice: don't file a foreign patent application "unless there is a reasonable prospect of a substantial monetary return."

When reports come in concerning



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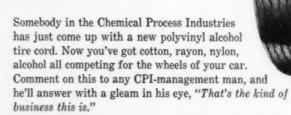
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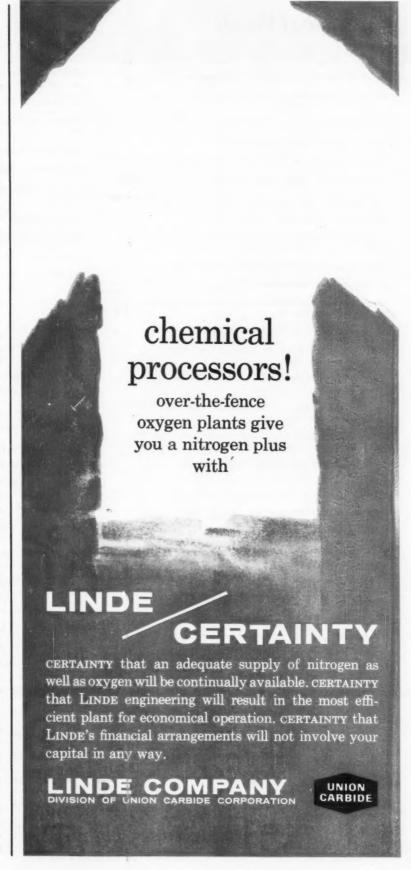


apparent infringement, have them received and investigated by your company's patent or law department, suggests Austin Phillips, staff assistant, Patents and Licenses Dept. of American Cyanamid Co.

"Caution is required to sift rumor and mere offers to sell (except in countries under the laws of which an offer is an act of infringement) from an actual sale or other infringing act," he points out. Then send patent warning letters directly from this central office to the alleged infringerwith one proviso: Be careful in your warning letters; always remember that if you threaten an infringement suit and then don't follow through, you may be open to counteraction.

EXPANSION

- · Sherwin-Williams Co. is converting a recently purchased Chicago building into a \$1.5-million center for biological and analytical research and research and development in solvent and emulsion coatings, and study of mineral raw materials.
- · Acme Shellac Products Co. has begun expansion of its Newark, N.J., research and technical service labs.
- Hummel Chemical Co. (New York) recently completed a second research lab at its Newark, N.J., plant. The new lab is for investigation and synthesis of potential rocket propellant chemicals such as hexanitroethane, hydrazinium nitroformate and trinitromethane.
- Sperling Laboratories Division of Foster D. Snell, Inc., has moved from Arlington, Va., to larger quarters at Baltimore, Md. Pharmacology and toxicology are the lab's specialties.
- · Varian Associates (Palo Alto, Calif.) has a new department for research on military applications of magnetometry. R&D will involve Varian's proton free-precession and alkali vapor types of magnetometers (devices to measure magnetic fields).
- · McNeil Laboratories has completed the first phase of its move from Philadelphia, Pa., to suburban Whitemarsh Township. New administration and research buildings at the 90-acre site are expected to be fully occupied by next spring.
- · B.F. Goodrich Co. plans to spend \$4 million to expand its research center at Brecksville, O., between Cleveland and Akron, subject



Chemical Week

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San Francisco 4 William C. Woolsten, 68 Poet St., DOuglas 2-4600 to action by the village's council in vacating a projected road. The firm would spend \$1.5 million at once and \$2.5 million more in the near future on its 300-acre site there.

• The Electrada Corp. (Beverly Hills, Calif.) will study physical and chemical effects of light in a new laboratory it plans at Culver City, Calif.

 A new \$3.5-million facility to simulate space conditions in testing satellites and spacecraft is being built by Lockheed Missiles and Space Division at Sunnyvale, Calif. Completion is scheduled for Aug. '61.

PRODUCTS

Rare-Earth Metals: Dysprosium, erbium, gadolinium, holmium, samarium, and ytterbium are now available in high purity (e.g., iron less than 0.03%) from High Purity Metals, Inc. (340 Hudson St., Hackensack, N.J.), a subsidiary of Accurate Specialties Co., Inc. Minimum lot: 25 grams.

Heavy Water: A leasing program for deuterium oxide is now in effect at Bio-Rad Laboratories (32nd and Griffin Ave., Richmond, Calif.). Procedure: The customer takes delivery on the heavy water on a lease/purchase basis, uses it as he desires. The water is returned when and if the customer wishes, and he receives a credit based on the length of time the water has been kept and the amount of dilution it has undergone.

Intermediates: Eastern Chemical Corp. (Newark, N.J.) now offers experimental quantities of a series of new hydroquinone derivatives, including the nitrodibutyl, nitrodiethyl and nitrodimethyl ethers and the di-npropyl ether of chlorohydroquinone. They are suggested as intermediates in the manufacture of dyestuffs, pharmaceutical and photographic chemicals, antioxidants, etc.

Alcohol Entry: Elaidyl alcohol, the trans isomer of oleyl alcohol, is available in 99% purity from Applied Science Laboratories, Inc. (State College, Pa.). It's for use as a gas chromatography standard and for research in the crystalline compound's electrical properties. It's made from high-purity methyl oleate by saponification, isomerization, re-esterification and sodium reduction.

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Wanted Chemical Salesman with imagination We have excess capacity in large Pfaudler and similar reactors located in Georgia. What can we make that you can sell at a profit? SW-5589, Chemical Week.

Nanted Experienced, aggressive Chemical Salesman for metropolitan New York and New Jersey avea. Salary and commission. Send Resume and References to SW-5671, Chemical Week.

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POSITION WANTED

Furope. British graduate chemical engineer 10 years all phases chemicals plastics marketing, with international background. Offers experience to U.S. company considering penetrating European market. Age 37, five years management. Can visit New York 1961. PW-5670, Chemical Week.

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Monuol of Construction Management. For Chemical and Process Plant. National Schools of Construction, Publishers, Satsuma, Florida.

For recovery of precious metals catalysts, solutions, send for recovery schedule. Precious Metals Recovery Corp., 85 River Road, Nutley 10, N.J.

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Beigian chemical plant located in Brussels erea alongside canal to Antwerp, with equipment for processing of liquids and powders (grinding, drying, milling, blending, packing, etc. . . .) wishes to diversify present production range or start new industrial activities covering Common Market countries. All types of co-operation (license, contract manufacturing or others) will be considered. All communications received will be treated confidentially. CWW-5715, Chemical Week.

If you are a manufacturer speking new or added sales outlets—or if you are a manufacturer's agent or chemicals distributor with the capacity, time and energy to take on additional lines—make your interests known in this column of Chemical Week. The right agent or jobbe teamed up with the saleswise manufacturer make the right combination for the hard selling day ahead. There's profit for both, which can be initiated through low-cost classified advertising Write Employment Opportunities, Chemical Week P.O. Box 12, New York 36, N.Y.

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Wanted: Patents and/or licenses arrangement, reputable California chemical corporation with facilities in the common markets of Japan and Mexico, interested in additional chemical items for manufacturing and distribution. Petroleum, marine and other specialized applications to industry. All information treated confidential. BO-5594, Chemical Week.

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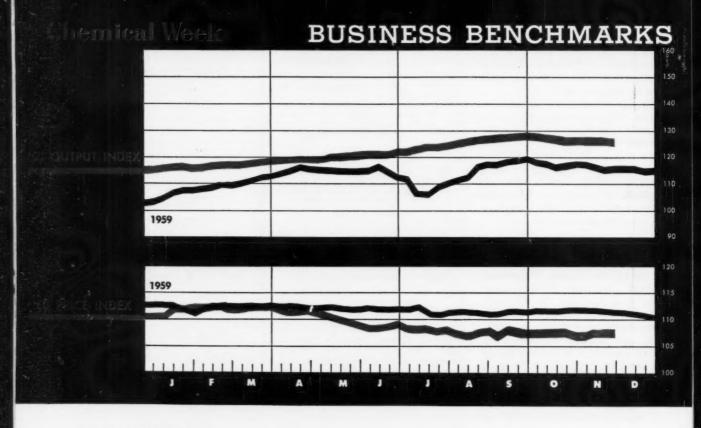
1800 gal. T316 Stainless jucketed reactor, vacuum internal, agitator, 7½ HP drive. Perry, 1415 N. Sixth St., Phila. 22, Pa.

Still Bottoms Manufacturer offers wide veriety of new type still bottoms available on continued basis form unique plant—6¢ lb. bulk. FS-5692, Chemical Week.

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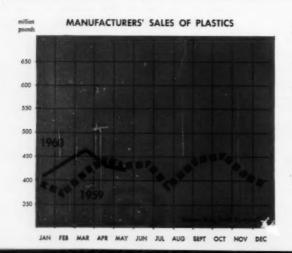
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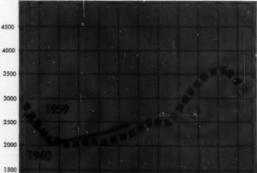


DECEMBER 3, 1960

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1957=100)	125.0	125.2	116.9
Chemical Week wholesale price index (1947=100)	107.0	107.3	110.8
Stock price index (12 firms, Standard & Poor's)	46.71	47.41	58.40
Steel ingot output (thousand tons)	1,352	1,470	2,540
Electric power (million kilowatt-hours)	14,042	14,111	13,812
Crude oil and condensate (daily av., thousand bbls.)	6,968	6,955	6,934
PRODUCTION INDICATORS (1957=100)	Latest Month	Preceding Month	Year Ago
All manufacturing	110	108	106
Nondurable goods manufacturing	118	117	117
Durable goods manufacturing	104	102	98
Chemicals and allied products	122	122	118
Industrial chemicals	127	124	123
Petroleum and coal products	110	115	105

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to make clear, no-drip dipping compounds of liquid resins

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compatible with the liquid phase of any resin system. And, it lets you maintain perfect clarity or brightness of color, depending on your needs, since it has no effect on resin transparency or on the tinting strength of coloring pigments. The coating is easily applied, and the finish is smooth and even.

There's much more to the Cab-o-sil story. The end uses of this superfine "airborne" silica are still being explored. Here are some of the ways in which this immensely useful agent, with its superfine particle size (11.1 million billion particles per gram), its uniformly high purity (99.7%) and its chemical inertness, is being used today.

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Because they meet the twin requirements of end-product quality and production efficiency, TITANOX-RA and TITANOX-RA-50 rutile titanium dioxides are favorites with paint formulators. These easy dispersing pigments provide high brightness, whiteness and hiding power at low pigmentation. Both retard after-yellowing and, in addition, TITANOX-RA-50 retards chalking in finishes that may be exposed to the weather. Above all, the uniformity of these pigments in all properties make them favorites with paint production men.

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TITANOX titanium-calcium pigments—TITANOX-RCHT (30% Ti0₂) and TITANOX-C-50 (50% Ti0₂) provide the necessary hiding power and contribute to the specialized film properties needed for base coats on wood. For outdoor furniture finishes there is, in addition to TITANOX-RA-50, TITANOX-RA-NC, the rutile titanium dioxide with maximum chalking resistance.

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